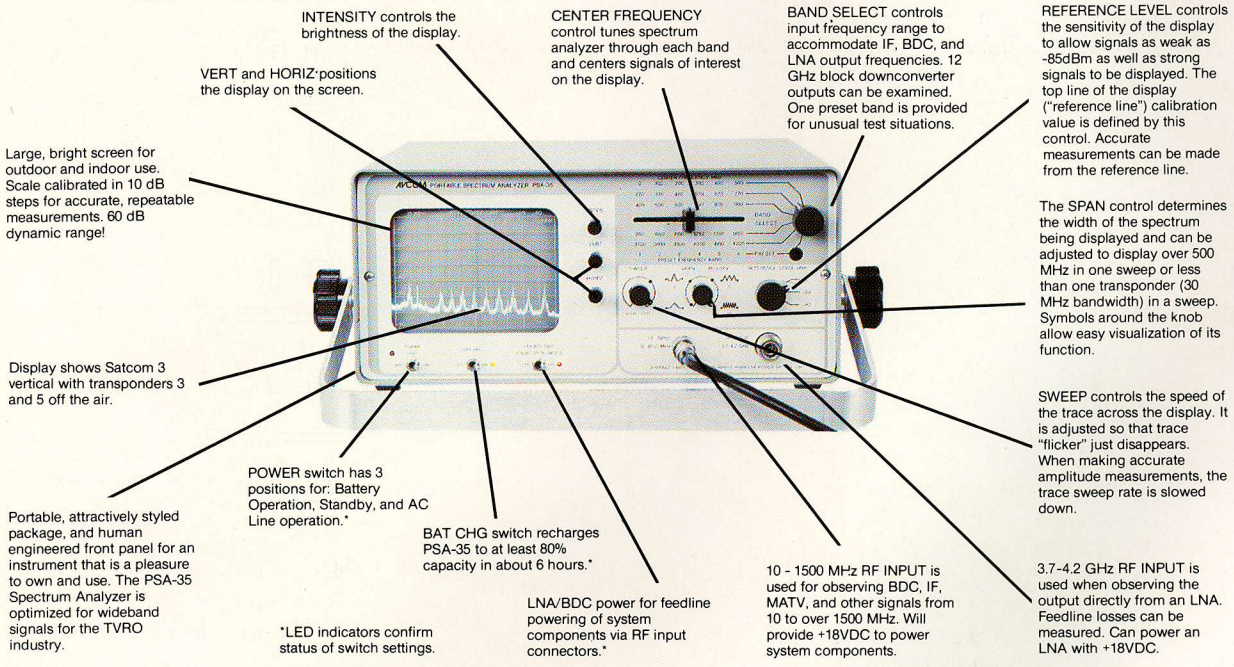
COOP'S SATELLITE DIGEST

JUNE 01, 1985

INTERNATIONAL EDITION

AVCOM's PSA-35 Portable Spectrum Analyzer Designed with you in mind— Basic enough to begin with— Sophisticated enough to grow with!



KEYWORD EXPLANATIONS

SPECTRUM ANALYZER — an instrument used to display signal amplitude vs. frequency over a selected range of frequencies (bandwidth). Amplitude is shown by the height of the trace on the screen.

REFERENCE LEVEL — in our context, a line at the top of the display that defines signal level at that point. Equally spaced lines below it at 10 dB intervals enable easy readout of various signal levels.

dBm — the most useful unit of measurement of signal strength (power) for our industry. It means decibel referenced to 1/1,000 of a watt of power. The following list will help you put dBm values into perspective:

+20dBm — 100 mw (1/10 watt)
+10dBm — 10 mw (1/100 watt)
0 dBm — 1 mw (1/1,000 watt)
-10dBm — .1 mw
-40 dBm — .0001 mw (typical BDC output)
-70 dBm — typical 4 GHz feedline signal

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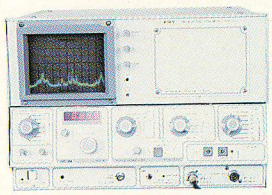

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- Sophisticated Styling
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THE MOST VALUABLE TEST INSTRUMENT YOU CAN BUY FOR INSTALLING AND SERVICING TVRO SYSTEMS!!

TOP OF THE MONTH

MARKET analysis. The industry's first 'in depth' study of what makes up the TVRO marketplace is complete and as **CSD/2** readers saw in a preview glimpse on May 15th, there are some surprises. The market to date has been largely supported by 'high-tech' people, many of whom live where cable TV service IS available. Continuing from CSD/2 on May 15th, we look further into 'the scope of our marketplace.'

AUDIO specifications for receivers are confusing at best. Not all receiver designers play by the same 'rules' and the dealer is left to sort out which specifications are 'meaningful' and which are unimportant to the consumer. We try to figure out why, here.

OFF-Set fed antennas appear to have some advantages which the industry can put to use in suburban and urban markets where antenna size and TI are important factors. Researcher **Jim Vines** explains the basis for offset antennas to better equip you for the onrush of new antenna technology just around the corner.

TED Turner's CNN/European project is stirring up plenty of 'dust' in Europe, months in advance of the scheduled September 15th 'launch' Coop looks at why, and discusses some of the problems faced by CNN in Europe in his 'Comments' section this month. YES, it **will impact** North American TVRO activity.

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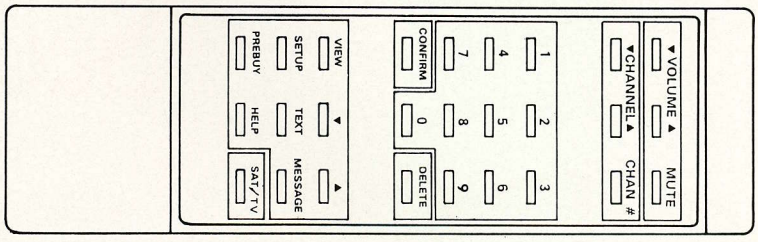
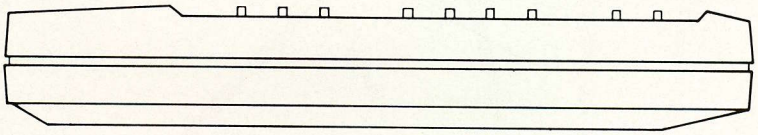


VIDEOCIPHER II WIRELESS REMOTE CONTROL UNIT



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OUR COVER/ Luxor's **Bo Lindqvist,** responsible for the final design and product creation for the Luxor/Skantic line of satellite receivers, tests a new 11/12 GHz LNB and feed on a dish at CSD's Providenciales test range in the northern Caribbean. From a late winter snow storm in Motala (Sweden) to 80+ sunshine in 24 hours; see **Coop's Comments** in July.

COOP'S SATELLITE DIGEST

INTERNATIONAL EDITION

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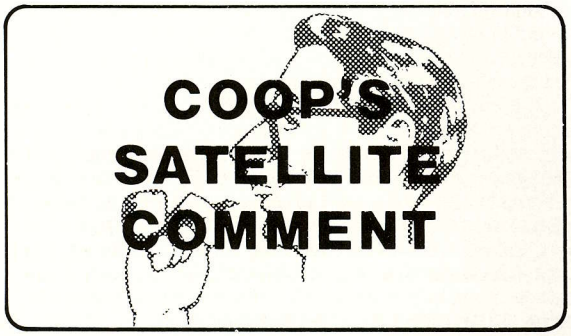


- **MORE SCRAMBLING Fall Out**
- **TURNER's CNN Launch In Europe**
- **CHAPTER 11 Problems**

ANOTHER PROGRAMMER View

Those who tuned in **Boresight** on May 30th or happen to catch us on June 6 **(*)** coming up will have gotten another view of how a cable program source views the great scrambling debacle which this industry is now caught up with. I spent a day in Tulsa, Oklahoma with **Roy Bliss** and **Jeff Treeman** of **United Video** recently and since I had my trusty BY110 color camera and ENG gear along suggested we do a couple of interviews for Boresight.

Roy Bliss is second generation cable; his Dad was one of the REAL pioneers in cable television and in fact his father was involved in a landmark cable court case ('Carter Mountain') which helped formulate FCC cable policy back in the 50's and early 60's. One would suspect that as CEO for United Video, Roy would have a bias towards cable that is so strong that he would be an unfortunate person to engage in a debate or dialogue concerning home TVRO. Not true.

United Video brings us **WGN** as well as **KTVT** and **WPIX** on the video side. His very creative engineers have also loaded up the WGN subcarrier space with more services than you can count, unless you have a high resolution spectrum analyzer. United Video is a 'common carrier' but in the common carrier world, they are a most **un**common carrier.

Roy told me about a recent meeting of the **Oklahoma Cable Television Association.** I know the group; I used to run their annual meetings and many of my best friends are cable operators in Oklahoma. They used to let me ride around in their private two-engine aircraft and in the back seat of their Mercedes Benzs once or twice a year just so I could appreciate how hard they had worked to get where they are.

Roy said, as those who saw (or will see) the Boresight piece should notice, that in the recent Oklahoma cable group meeting, they spent 1/2 of the meeting exchanging 'horror stories' about TVRO. Seems that cable operators in Oklahoma, like many of the southwestern states, are **'paranoid'** (Roy's descriptive term) about TVRO. Roy pointed out several things to me which helped me better understand the cable position.

1) **People ARE dropping cable for TVRO.** Nobody in Oklahoma seemed to know how many have left cable yet but the message is that in the smaller communities with between say 100 and 5,000 cable subs, the numbers are becoming substantial.

I wanted to know what 'substantial' meant. Roy gave me an example.

"Right now, today, the cable system operator can get as much as $1,000 for each subscriber he has. That means that if he has 1,000 subscribers, he can collect $1,000,000 for his cable system from a big-time operator such as TCI. That also means that each time a cable subscriber decides to leave the safety of the cable service, the cable operator just watched a $1,000 bill walk away from him. If a cable operator drops ten homes **in a year to TVRO encroachment, he just watched $10,000 walk away."**

Hummm.

Roy went on.

"We are being pressured, daily, by cable operators to scramble. I am getting letters and telephone calls. I am getting personal visits. If this thing is not being planned, orchestrated, then I am witnessing a response from cable systems that is larger than anything I have seen in cable."

ROY BLISS/ CEO for United Video says 'cable pressure is building' **to scramble even the advertiser supported services such as WGN.**

Why would cable operators be all over Roy Bliss to get him to scramble WGN (and WPIX and KTVT)? Aren't these advertiser supported services that only cost the cable operators a dime a month to carry?

"WTBS is getting the same kind of pressure. This is no fleeting thing; the cable people, especially the rural cable operators, are really bent out of shape. TVRO is costing them money!"

So what is the position of United Video? Can they afford to scramble? Can they afford not to scramble???

"We get a dime a month a home. If we have 1,000 subscribers in West Over-Shoe, Oklahoma, we get $100 a month. If we had to supply a descrambler to each of our cable and SMATV affiliates, it would cost us a fortune; a real fortune. On top of that we would have to modify our uplinks and spend millions for the encryption part of the system. And if we were interested in doing it the same way HBO has done it, with the Linkabit system, all of our (revenue producing) subcarriers would be up a creek without a paddle!" (Remember that Linkabit uses no subcarriers and boasts advantages because it uses **no** subcarriers).

So how will Roy Bliss and United Video get out of this 'fix'?

"Setting aside which equipment makes the most sense (M/A-Com or another) **to us,** I think there may be a gradual recognition on the part of the cable operator who is shouting 'scramble' that it is in **his best interest to offer to pay for the descrambler.** A service such as ours, collecting 10 cents a home a month for transmission services cannot be expected to pay for a descrambler for each cable or SMATV

*/ **BORESIGHT, Thursdays, F4, TR20, 9PM (ET).**

headend like HBO; not when HBO collects $4 or more per month per subscriber. The numbers are simply not there. So what I see happening is a concensus on the part of the cable operators that they will agree to pay for at least their own descramblers. This does not solve our special and immediate engineering problem caused by our large group of subcarriers, but at least it is a start."

WGN is of course in a unique situation; WTBS, after moving off of F3R, TR6, to Galaxy 1, TR18, left its subcarriers behind with SPN on F3R. It could scramble using Linkabit and not have problems. Others, such as CBN, who have opted to load up on subcarriers would have the same problem as WGN. The subcarrier problem is not an 'impossible' engineering challenge but it does complicate the Linkabit scrambling system and it forces some compromises by the uplink operator.

Bliss has been talking with **Caanan Communications,** that outfit in New England that wants to act as a middleman for programmers and scramble perhaps as many as 15 to 20 different services (including WGN). Caanan claims to have a scheme worked out whereby it would provide each programmer/uplinker with one or as many encryption machines as they need to handle their channels, and then to provide each authorized (cable, SMATV) downlink site with a compatible decryption machine. Caanan to date has been leaning towards the **Scientific-Atlanta** scrambling system and they have not been overly friendly with M/A-Com. The concept appears to have merit, according to Roy Bliss and he thinks that the $100M they will need to raise to make this happen might be feasible. Bliss, a seasoned businessman, does not offer that type of observation casually.

If someone such as Caanan came along, how would that sit with HBO? They would have three choices; leave their own M/A-Com system intact and continue to offer their cable affiliates the M/A-Com encrypted feeds and also offer themselves as a stand-alone pay package as is discussed here on page 26 this month. Or, they could allow Caanan or someone else to take out all of the M/A-Com hardware and replace it with say S/A hardware to make everyone in the package compatible. Or they could do 'both'; leave the M/A-Com stuff where it is, for cable, and then allow Caanan to find two or four new transponders for them on say F4 or some other 'higher elevation bird' which would be for home use only, and which would share the same scrambling technique as the other Caanan marketed channels.

Lots of things 'could' happen. Right now all we know for sure is that programmer suppliers such as United are really beginning to feel 'the heat' from cable operators and while, as Roy admits, most of the heat is coming from the smaller and a few medium sized cable firms, he will not be surprised to see it graduate to the big MSOs before 1985 is over. How long can United and other common carriers (such as Eastern with WOR or southern with WTBS) hold off the pressures of these cable operators who keep seeing people converting to TVRO and $1,000 bills walking away from them on the street? Nothing hurts a man with a private two-engine airplane and a Mercedes Benz more than seeing his $1,000,000 business property slowly losing value week by week. Every time **you sell** a TVRO into a cable area and **your customer drops cable,** you just cost the cable operator **a grand.** Now, do you REALLY need to ask **why** the cable guy is **madder than hell at you?**

WHOSE MARKET Is This . . . Anyway?

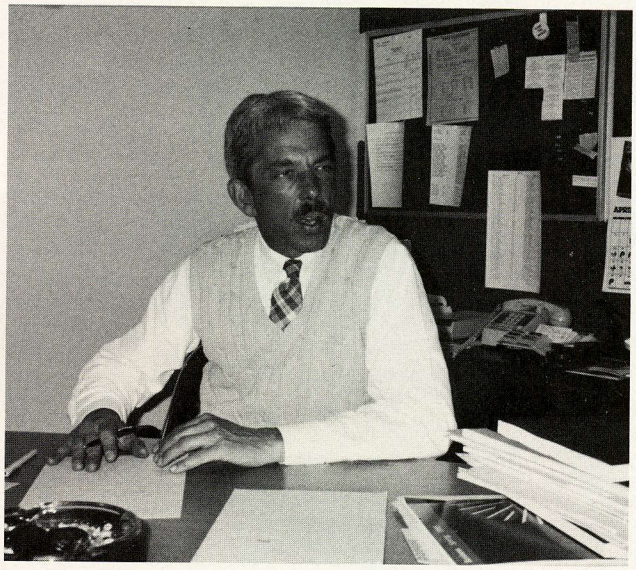
If United Video's Roy Bliss is warning us about the rapidly increasing cable pressures to make even 'basic services' scrambled, United's **Jeff Treeman** is equally concerned about where the TVRO market 'goes next.' Jeff's staff was instrumental in getting the **'1985** (CSD) **TVRO Market Profile'** study underway (see this issue, page 8 and my primary reason for stopping in Tulsa recently was to sit and meet with Jeff and his staff to see what their interpretations of the final Marketing study tabulations might be.

I first met Jeff about a year ago and quickly formed an opinion; that being that while we have some pretty darned good 'salesmen' within the home TVRO industry, I didn't realize until I met Jeff the significant difference between 'marketing' and 'selling.' Jeff is a marketing man and he talks in a concise and often animated style that quickly lets you know there is more to 'selling' than trotting out a product and reducing the price when competition appears.

United sells some pretty complex services; TV is the 'simple service' because it pretty much sells itself. . But their audio subcarriers and data loaded subcarriers require thousands of hours of preparatory study and work before they can be 'offered' in the marketplace. Jeff is a professional market research person who loves to figure out why people do, or do not, buy something they do or do not need.

"The easy sales are over; I suspect that this year is starting out slowly for TVRO" he smiled as we talked about the state of TVRO. "I can look through this (CSD) Marketing Profile and put my finger on a dozen things people should be focusing on to make sales start up again. Here, let me show you." And he wheeled into the section that deals with people's motivations for TVRO.

"Look here at the age breakdown for people who say they bought because of sports programming" suggested Jeff sliding his finger along several columns of figures. "Now cross-index to the income levels. Let's take these behavorial profiles and transfer the leaders to the reasons people say they have dropped cable. See here



JEFF TREEMAN/ Vice President of Marketing for United Video believes the next TVRO growth is going to come harder.

. . . there is a pattern! I can read this and tell you exactly how to promote TVRO in a specific neighborhood; it jumps out at you. If you have a neighborhood or suburb where you have a certain income status and a certain age grouping, you can tailor your promotional program to catch these people where they are the most vulnerable; **you tickle their sensitivities!".**

Jeff Treeman maintains that up to this point, the TVRO buyer has bought in spite of our shortcomings as skillful marketing people; in spite of the fact that we as a group of retailers can barely explain what a TVRO is or why somebody should want a TVRO.

"The next level of big sales, the first or leading edge of the mass market TVRO claims it is ready to tackle, will be sold in 'spurts.' You will mess around and by accident discover the right sales message and get it to the right bunch of people and they will flood in to buy TVRO. Then when you have exhausted that group of potential buyers, you'll have to stumble around looking for the right 'hot button' to push to get to the next group. American buyers are all in groups and to be successful with a product such as TVRO, which on the surface has almost universal appeal, you need to carefully study where those 'hot buttons' are located. Once you do, it will be like striking a vein of gold; the sales will fairly pour out on top of you. When each vein of special interest group people is tapped out, **then you'll have to look for a new vein."**

Jeff Treeman, and firms who deal in modern telecommunications packaging, know and understand marketing behavioral patterns. After spending twenty minutes with Jeff, I am not so sure I have ever met

COOP'S COMMENTS/ continues on page 65

BR Introduces Something Wonde

The ultimate TVRO system. It's not just a dream anymore.

Together, Panasonic and BR Satellite have made it a reality. Because Panasonic chose BR to be the first satellite distributor in the world to represent their new satellite equipment. It's the system of the future—and you can only make contact with it through BR.

So how do you build this dream system? Start with the Panasonic receivers. Panasonic has combined unmatchable American TVRO technology with precision Japanese production engineering. Result? Advanced, easy to use receiver systems with a minimum failure rate. These block down conversion systems are expandable, encouraging future sales. And Panasonic is supporting the line with national consumer advertising, and competitive pricing.

The C-2000: Tomorrow's reception today.

This receiver offers exceptional video quality in the most user-friendly satellite receiver on the market. It requires no training to master. It operates with a block down converter and comes with infrared control with a built in dish drive.

The Ku/C-6000

Panasonic introduces a dual band receiver, operating at both 4 and 12 Ghz, which incorporates many of the outstanding features of the C-2000, and adds stereo audio. This industrial quality product is used for small head-end systems and specialized uses, such as telecon-ferencing, SMATV systems, and DBS reception.

The CI-LNB

Panasonic's C-band low noise block down converter features an ultra stable ceramic local oscillator for minimum drift, a cast aluminum case and waterproof construction. The three stage GaAsFET RF amplifier provides excellent low noise specifications of 100°K, with low input and output VSWR and tightly controlled gain variation for superior quality satellite video reception. Also available in 85°K.

PENTEC/MTI ANTENNA POSITIONERS: Part of any great system.

Pair up your Panasonic equipment with a Pentec/MTI antenna positioning system. The 4100 gives you a nonvolatile memory that

s Panasonic:
rful Has Happened

lasts 99 years and never needs a replacement battery, and easy-to-read keyboard, a wireless infrared remote control, and more. The 2800 offers you affordable excellence, superb design, style and ease of operation in a manual East West digital antenna positioner.

THE BR ANTENNA: The best antenna in the market completes the system.

This high gain 10 foot mesh antenna gives you clear, brilliant reception. It assembles in 90 minutes and is UPS shippable, in just four boxes. Outstanding construction makes it both weatherproof and reliable.

NOW—GET BR DEALER'S BONUS POINTS

When you order from BR, you get bonus points that can net you free gifts. Watch for our brochure, which will give you all the details. And there's a special gift for dealers ordering from BR for the first time.

ONLY AT BR: The "ULTIMATE ONE YEAR WARRANTY".

BR assures you that we will replace any defective equipment purchased from us. So call BR Satellite toll free, and we'll rush you full information. And remember—BR has a top flight customer service staff ready and waiting to expedite all your service needs. That includes replacing an item or having it repaired, whether the item is in or out of warranty.

CALLING ALL SMALL DEALERS

Please understand—if you're a small dealer, we want to hear from you. We guarantee you'll get all the benefits of large dealers; service, support, and stock. Call us toll free. Let us tell you what BR can do for you.

Be part of BR Satellite's wonderful system. Call soon—our stock is moving fast!

1-800-421-0148 National

1-800-832-6660 NY State Outside NYC & LI

35 Lumber Rd., Roslyn, NY 11576
516-484-6080 (NYC & LI)
Hours: Mon–Fri 9:30–5:30
Sat 10:00–3:00
E.S.T.

"We Distribute Trust"

MARKET ANALYSIS: WHO OUR CUSTOMERS ARE

Knowing **who** our consumer customers are and what motivates them to purchase TVRO is one thing; to better understand **how** they use their TVRO system and **why** they have opted to discontinue cable television service in favor of TVRO is quite another.

There is the 'myth', unsubstantiated, that TVRO is '90% rural' and that to date TVRO has been a not significant threat to existing cable television franchisees. This study handles that myth for the first time, and finds the story lacking.

TVRO is affecting cable; those cable operators who seem 'paranoid' about TVRO (see **Coop's Comments,** this issue) may indeed have something to be paranoid about. We asked our survey participants **'Do you currently have access to cable television?'.** The answer? **26.5%** do have access to cable; or to round off a number, 1 present day TVRO owner in 4 could be plugged into cable TV if that was his or her choice. We'll see how many actually do take advantage of cable's availability shortly.

With the United States broken into five major geographic districts (see **CSD/2** for **May 15th**), it is possible when reviewing the cross-tabulated results of the study to find where the conflict between cable and home TVRO is greatest. The answer is that in the southwestern United States **37.4%** of all TVRO owners have access to cable.

With the advantage of cross-tabulations we could also tell other things about the cable and TVRO 'conflict'. For example:

1) People who have five or more off-air (i.e. non-cable) television services available are also the most likely to purchase a TVRO. As a comparison, people who receive five or more off-air signals are **four times as likely** to invest in a TVRO than people who have **no TV service** available (so much for that myth!).
2) The percentage of people buying TVRO plotted against those people who had cable available for the periods 1984, 1983, 1982 and 1981-80 shows a very steady relationship; with 26.5% of all people owning TVRO having cable available to their homes, the four year pattern never diviates more than a few percent (per year).

If 26.5% of all TVRO owners live where cable is available, what percentage of those owners subscribe to the cable? The answer in a moment.

There are at least two ways to look at the numbers to follow. If you are interested in pinpointing how many people simply **'must have'** every (video) service that is available to them, without apparent regard to cost, you may be impressed to learn that 23.0% of those who have cable available do still subscribe. With certain limitations, another way to look at that number is as follows:

A) 1 home in 4 with a TVRO has cable also available, and,
B) 1 home in 4 with cable available does subscribe to it, and
C) Therefore cable can expect to retain 25% of its present subscribers who may ultimately opt for a home TVRO system.

And that means that 77.0% of all homes located where cable is available **do not subscribe to cable.** Some of those never did; that figure is **24.8%.** This might be a very interesting sub-group to study; they had cable available, and they did not subscribe. **But they did purchase** a home TVRO system. And that leaves us with those who live where cable **is** available, who **did subscribe** at one time. That percentage? **48.7%** of all homes located where cable is available. Again, with limitations, that means:

A) 1 home in 4 with a TVRO has cable available, and,
B) 1 of those homes in 2 once subscribed to cable but no longer does, in favor of a TVRO, and
C) If you take that number far enough, again with limitations of extrapolation, cable can expect to lose 50% of its customers **when** those customers opt for a TVRO.

There are some very revealing sub-tabulations in the full 150 page **'1985** (CSD) **TVRO Market Profile'.** One tells us that while the percentage of people buying TVRO living where cable is available has NOT changed markedly over the four year recorded selling history of TVRO, there **was** a very significant change **during 1984** with those people who were buying TVRO **and discontinuing cable service.** It was an upward trend which was exactly balanced in the opposite direction by people who retained their cable connection (i.e. a number or percentage that was heaviest with people who had their TVROs several years or more). All of which says that the 'conflict' between cable and TVRO appears to be far more real than most studies or estimates have previously recorded.

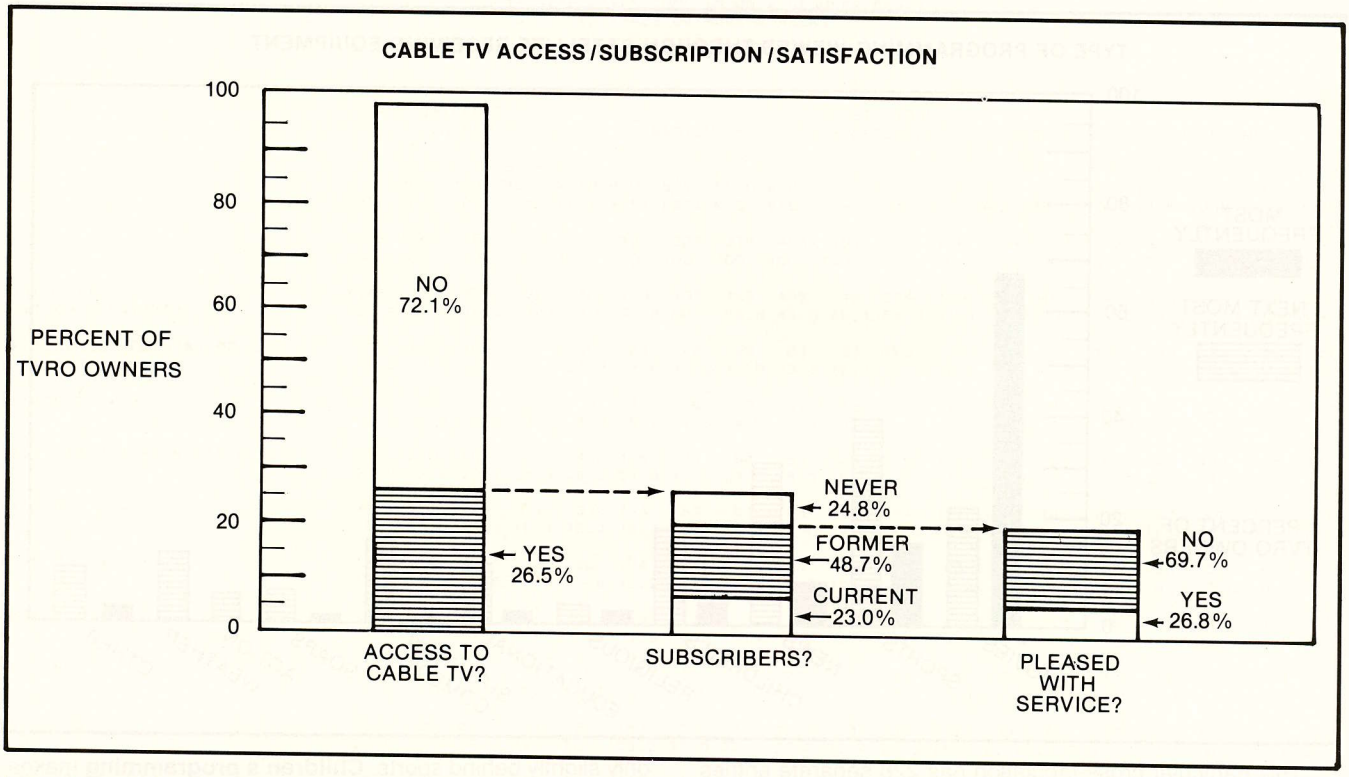
PLEASED With Cable?

A retailer of TVRO, looking for a 'marketing hook', is going to want to know what motivates people to buy TVRO. The answers are diverse, and vary by geographic district of the USA, by the age of the head of household, and to a small extent by the number of off-air TV services available to the potential customer. Income level of the buyer also has a profound effect on the 'motivation' to own a TVRO.

But if they have cable available, why would they ALSO opt for TVRO? Until now, the theory has been that people who consider TVRO where cable is available are but a tiny, insignificant part of that upbeat, 'have-to-have-everything' crowd. Perhaps, but the study suggests otherwise.

For example, we found that of those who currently or

CSD/2 on May 15th began this two-part series which looks at the statistical analysis resulting from an in-depth study of more than 2,000 present day TVRO owners. **CSD,** in conjunction with a major telecommunications company, created this study to measure the type of marketplace we have in TVRO and to learn more about the motivations and expectations of TVRO owners. A detailed explanation of the survey methodology and an explanation of the survey results is found on pages 9 to 15 in **CSD/2** for **May 15th.** Readers within the United States who somehow missed that report may secure one free of charge by writing **'CSD Survey, P.O. Box 100858, Ft. Lauderdale, Fl. 33310'** or by calling Carol Graba at 305/771-0505.



formerly use(d) cable, **26.8%** said they 'were pleased' with the cable service. Far more, nearly 70%, said they were **not pleased with the cable service.** And just as there are well run cable services so too are there poorly operated cable services. Perhaps one strong message here is that cable firms who to date have been reluctant to upgrade their facilities and maintain a 'we-try-harder' attitude within their communities will reconsider now that the people they serve have a 'second option' for television reception; **TVRO.** We did find some interesting geographical divisions on this question; people in the 'Southeast' were more pleased with their cable than elsewhere while people in the midwest were least pleased with their cable.

There was a reverse question in the study; **'Are you pleased with your TVRO equipment?'.** We found **62.8%** were 'extremely pleased' while only **5.4%** were either 'somewhat dissatisfied' **or** 'very dissatisfied'. So in spite of our own internal industry concerns that we may not be as skilled as we might like to be, on a relative scale we may be several times as skilled at making our customers 'pleased' as the cable people.

BIRDS We Watch

Nobody has ever attempted to create a 'bird popularity contest' before. We did not realize that was what we were doing until we visited the computer tabulations from our nearly 2,100 returned survey forms. The cross-tabulations on this one would keep a demographic profiler occupied for several 'exciting' days. We show just a handful of the results here as an example of the more than 50 such cross-tabulation pages found in the full **'1985** (CSD) **TVRO Market Profile'.**

What it tells us, as 'headlines', is this:

A) **Galaxy 1** is viewed 3 or more times per week by **88.1%** of all TVRO owners. People in the southeast and southwest like Galaxy 1 the most; people in the Pacific 'zone' like it the least.

B) The least-viewed American bird is **Westar 3** (6.2%) while ANIK D, the primary Canadian bird rates 8.9% of all homes 3 or more times per week (highest in the northeast at 11.8%). Note that actually SPACENET 1 ranks lower than Westar 3 but the very limited programming on it, plus its 'newness' puts it into a special category.

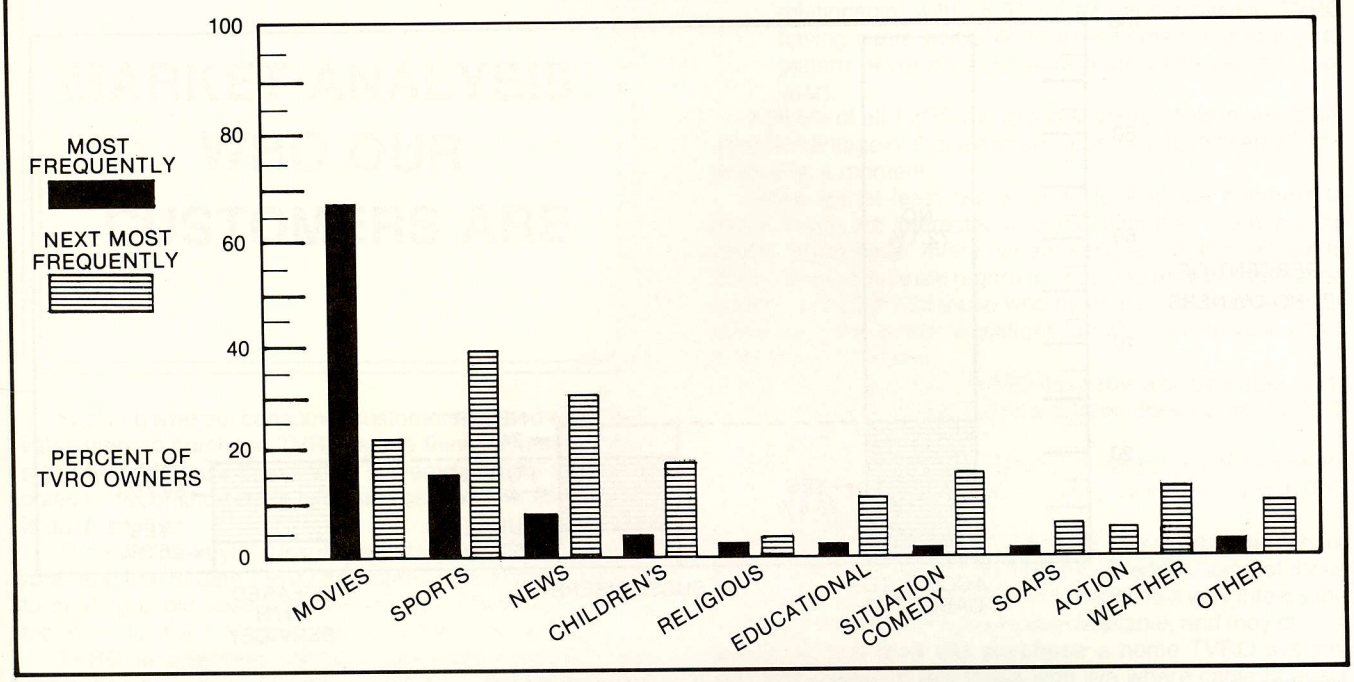
C) Not surprising, **F3R** ranks second behind Galaxy 1 (**83.8%** three or more times per week) while Satcom **F4** is a strong third at **54.9%.** F4, perhaps because of its high, desirable look angle, rates highest in the northeast (59.1%) and lowest in the Pacific (42.0%) where a 'lower' look angle prevails.

PROGRAMS We Watch

Ten program categories (plus 'other') were offered and we asked those completing the survey to indicate which of these were viewed 'most frequently'. Here is what we found:

1) **66.2%** overall watch **'movies most frequently'** although the percentage of people so-indicating drops remarkably the longer the user owns his TVRO (down nearly ten points for those with TVROs 3 years and longer).
2) **14.7%** watch 'sports most frequently' with a bell-shaped curve peaking for people who have had their TVROs 1 to 3 years. Those in the Pacific region are especially heavy sports viewers.
3) **News** was 'most watched' by **6.6%** of those surveyed but it was especially high for people who had their TVRO 3 years or more (11.1%) and those who live where no terrestrial TV reception is possible (20.6%).
4) **Children's programming** ranked highest in the mid-west while religious programming is most popular in the mid-west and Pacific regions.
5) **Movies** rank highest with people 35 to 49 years of age, and lowest with people who live where no terrestrial TV is available.

TYPE OF PROGRAMMING VIEWED THROUGH SATELLITE RECEIVING EQUIPMENT



This particular cross-tabulation has 228 separate entries so a real student of viewing habits can have a field day creating his own profile charts based upon length of TVRO ownership, where people live, how many off-air TV stations are received, the age groupings and the income level of the households.

If movies are the 'most viewed' programs on satellite TV, what comes in first as **'next most frequently viewed'?** Well, sports was number two in most frequently viewed and with **37.6%** it was tops in 'next most frequently viewed'. However, the gap closes in the 'second most viewed' category with news only slightly behind sports. **Children's programming** makes a surprising showing moving from 4th overall into selectively-ranked third position with some system owners.

Satellite viewing of networks, direct rather than through a local network affiliate, was another surprise. Of course many home owners do live where off-air reception for one or more networks is poor (or non-existent). Here is a small part of what we found:

Viewed Via Satellite/	**ABC**	**CBS**	**NBC**
1) Last 24 hours:	32.5%	**33.6%**	30.8%

Q.4 FACTOR THAT CONVINCED YOU TO BUY TVRO SYSTEM

		SATELLITE --OWNERSHIP---			---------REGION---------					STATIONS ---RECEIVE----		-----AGE------				-------INCOME-------			
	TOTL	LESS THAN ONE YEAR	1-3 YRS	3 OR MORE YRS	NRTH EAST	MID WEST	SOTH EAST	SOTH WEST	PACI FIC	NONE	1-4	OVER 5	18-34	35-49	OVER 50	UNDR $12M	$12M $17M	$18M $29M	$30M $49M	$50M OR MORE
TOTAL	2086	1240	783	54	170	725	337	278	464	102	1225	736	429	822	813	368	553	715	363
	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
SEEING A SYSTEM IN OPERATION AT A DEALER	517	336	170	10	47	184	98	77	88	25	271	218	114	224	172	93	136	185	86
	24.8	27.1	21.7	18.5	27.6	25.4	29.1	27.7	19.0	24.5	22.1	29.6	26.6	27.3	21.2	25.3	24.6	25.9	23.7
HEARING ABOUT/SEEING A FRIENDS/RELATIVES SYSTEM	721	462	247	11	55	257	116	103	159	27	467	223	172	246	299	146	202	243	104
	34.6	37.3	31.5	20.4	32.4	35.4	34.4	37.1	34.3	26.5	38.1	30.3	40.1	29.9	36.8	39.7	36.5	34.0	28.7
READING ABOUT TVROS IN A MAGAZINE	203	92	101	9	19	65	33	25	48	4	109	87	36	88	75	23	36	74	59
	9.7	7.4	12.9	16.7	11.2	9.0	9.8	9.0	10.3	3.9	8.9	11.8	8.4	10.7	9.2	6.2	6.5	10.3	16.3
ATTENDING A SHOW/FAIR	94	42	45	7	8	33	10	8	27	3	59	30	17	43	33	7	39	27	20
	4.5	3.4	5.7	13.0	4.7	4.6	3.0	2.9	5.8	2.9	4.8	4.1	4.0	5.2	4.1	1.9	7.1	3.8	5.5
NO CABLE/CABLE TOO EXPENSIVE	458	248	191	15	33	148	64	56	126	41	266	142	78	187	189	74	115	162	83
	22.0	20.0	24.4	27.8	19.4	20.4	19.0	20.1	27.2	40.2	21.7	19.3	18.2	22.7	23.2	20.1	20.8	22.7	22.9
OTHER	2	2				1	1					2		2				1	1
	.1	.2		-		.1	.3					.3		.2				.1	.3
NO ANSWER	91	58	29	2	8	37	15	9	16	2	53	34	12	32	45	25	25	23	10
	4.4	4.7	3.7	3.7	4.7	5.1	4.5	3.2	3.4	2.0	4.3	4.6	2.8	3.9	5.5	6.8	4.5	3.2	2.8

WHY DID THEY BUY? This table reveals the 'main benefit' **anticipated by the TVRO buyer from his TVRO system purchase. This is one of more than 50 such tables appearing in the '1985** (CSD) **TVRO Market Profile.**

Q.11 SATELLITES TUNE-IN ON A REGULAR BASIS
(3 TIMES OR MORE A WEEK)

		SATELLITE --OWNERSHIP---			--------REGION--------					STATIONS ---RECEIVE----		-----AGE------			------INCOME-------			
	TOTL	LESS THAN ONE YEAR	1-3 YRS	3 OR MORE YRS	NRTH EAST	MID WEST	SOTH EAST	SOTH WEST	PACI FIC	NONE	1-4	OVER 5	18-34	35-49	OVER 50	UNDR $12M $17M	$18M $29M	$30M $49M	$50M OR MORE
TOTAL	2086	1240	783	54	170	725	337	278	464	102	1225	736	429	822	813	368	553	715	363
	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
SATCOM F4 (SATCOM 4,SAT4,F4)	1145	733	379	26	110	419	203	155	195	46	636	450	229	458	449	178	306	398	218
	54.9	59.1	48.4	48.1	64.7	57.8	60.2	55.8	42.0	45.1	51.9	61.1	53.4	55.7	55.2	48.4	55.3	55.7	60.1
TELSTAR 302/COMSTAR D3 (TELSTAR 2)	275	155	106	12	36	84	48	33	61	17	165	88	50	95	128	43	82	98	41
	13.2	12.5	13.5	22.2	21.2	11.6	14.2	11.9	13.1	16.7	13.5	12.0	11.7	11.6	15.7	11.7	14.8	13.7	11.3
WESTAR 3 (W3)	130	72	55	2	8	45	25	13	33	13	70	45	18	37	73	29	25	52	17
	6.2	5.8	7.0	3.7	4.7	6.2	7.4	4.7	7.1	12.7	5.7	6.1	4.2	4.5	9.0	7.9	4.5	7.3	4.7
TELESTAR 301 (COMSTAR D 1/2)	456	280	162	13	48	158	73	64	86	29	265	157	102	162	188	65	134	158	79
	21.9	22.6	20.7	24.1	28.2	21.8	21.7	23.0	18.5	28.4	21.6	21.3	23.8	19.7	23.1	17.7	24.2	22.1	21.8
WESTAR 4 (W4)	375	206	159	9	31	131	53	51	88	25	224	122	55	123	195	62	102	120	77
	18.0	16.6	20.3	16.7	18.2	18.1	15.7	18.3	19.0	24.5	18.3	16.6	12.8	15.0	24.0	16.8	18.4	16.8	21.2
ANIK D1 (A-D)	185	114	67	3	20	74	24	12	34	13	109	60	35	65	85	33	50	65	31
	8.9	9.2	8.6	5.6	11.8	10.2	7.1	4.3	7.3	12.7	8.9	8.2	8.2	7.9	10.5	9.0	9.0	9.1	8.5
ANIK B (-B)	33	18	15		1	14	7	3	7	2	18	13	7	10	16	3	10	13	5
	1.6	1.5	1.9		.6	1.9	2.1	1.1	1.5	2.0	1.5	1.8	1.6	1.2	2.0	.8	1.8	1.8	1.4
SPACENET 1	83	47	33	3	8	25	10	11	21	8	43	32	17	24	40	17	18	23	16
	4.0	3.8	4.2	5.6	4.7	3.4	3.0	4.0	4.5	7.8	3.5	4.3	4.0	2.9	4.9	4.6	3.3	3.2	4.4
WESTAR 5 (W5)	559	320	224	13	35	183	108	75	123	33	305	213	98	200	257	90	146	206	96
	26.8	25.8	28.6	24.1	20.6	25.2	32.0	27.0	26.5	32.4	24.9	28.9	22.8	24.3	31.6	24.5	26.4	28.8	26.4
COMSTAR D4 (D4)	632	411	208	10	62	233	109	79	110	30	374	222	145	254	230	106	185	220	95
	30.3	33.1	26.6	18.5	36.5	32.1	32.3	28.4	23.7	29.4	30.5	30.2	33.8	30.9	28.3	28.8	33.5	30.8	26.2
SATCOM F3R (F3,SATCOM 3,F3R)	1748	1030	669	42	134	607	265	229	417	88	1044	601	365	691	677	301	461	611	303
	83.8	83.1	85.4	77.8	78.8	83.7	78.6	82.4	89.9	86.3	85.2	81.7	85.1	84.1	83.3	81.8	83.4	85.5	83.5
GALAXY 1 (G1)	1837	1125	668	38	155	635	309	255	387	85	1074	660	396	738	687	311	495	644	310
	88.1	90.7	85.3	70.4	91.2	87.6	91.7	91.7	83.4	83.3	87.7	89.7	92.3	89.8	84.5	84.5	89.5	90.1	85.4
SATCOM F1R (F1,FIR,SATCOM 1)	503	290	194	17	44	170	55	75	132	42	297	159	101	180	220	85	140	178	81
	24.1	23.4	24.8	31.5	25.9	23.4	16.3	27.0	28.4	41.2	24.2	21.6	23.5	21.9	27.1	23.1	25.3	24.9	22.3

WHO VIEWS WHAT? This table, one of more than 50 created by cross-tabulation indexing, reveals the percentage of homes tuning in various satellites 3 or more times per week.

2) Within last 7 days: **54.1%** 54.0% 51.7%
3) Within last 30 days: **65.4%** 64.3% 62.2%

Similar measurements, based of course on viewer recall rather than 'diaries', for some of the more prominent satellite services went like this:

Viewed Via Satellite/	**WTBS**	**WGN**	**USA NET**
1) Last 24 hours:	**36.9%**	27.7%	20.5%
2) Within last 7 days:	**60.2%**	51.3%	41.2%
3) Within last 30 days:	**72.1%**	65.2%	54.1%

Regional impact is of some interest; **WTBS** ranks highest in the southeast and southwest and with people 18 to 34 with incomes between $18,000 and $30,000 per year. **WGN** ranks highest with people in the midwest and southwest with people 18 to 34 with incomes in the same $18,000 to $30,000 region. **USA Network,** on the other hand, ranks highest in the northeast with people 18 to 34 and in the same income category.

What about ESPN, HBO and Showtime? We already know that movies rank number one and sports ranks number two with home TVRO viewers. Here is a **small part** of what we learned:

Viewed Via Satellite/	**HBO**	**SHOWTIME**	**ESPN**
1) Last 24 hours:	**54.4%**	46.3%	28.9%
2) Within last 7 days:	**81.3%**	75.7%	49.3%
3) Within last 30 days:	**89.0%**	84.8%	61.6%

Behaviorial tendency profiles from the data base told us **who** is most apt to watch which of these services. **ESPN,** for example, is most apt to be watched by people in the northeast who have owned their TVRO 1 year or longer, age 35 to 49 earning $50,000 or more per year. **HBO,** on the other hand is most apt to be watched by people owning their TVRO **less than** 1 year, living in the southeast, age 35 to 49 earning $18,000 to $30,000 per year. And **Showtime** is most apt to be watched by people owning their TVRO from **1 to 3** years, living in the mid-west or southeast, aged 18 to 34 and earning $18,000 to $30,000 per year.

A profile for virtually all of the popular services emerges from the reams of data and it may be the first demographic information ever compiled of people who have **universal access** to virtually **ALL** of the **cable program products** including network fare. The networks, by the way, are most popular with people over 50 with CBS viewers generally 'oldest' and NBC (satellite) viewers generally 'youngest'.

WHERE Viewers Get Their 'Guide Data'

Because the home TVRO owners surveyed came from a

MARKET PROFILE/ continues on page 14

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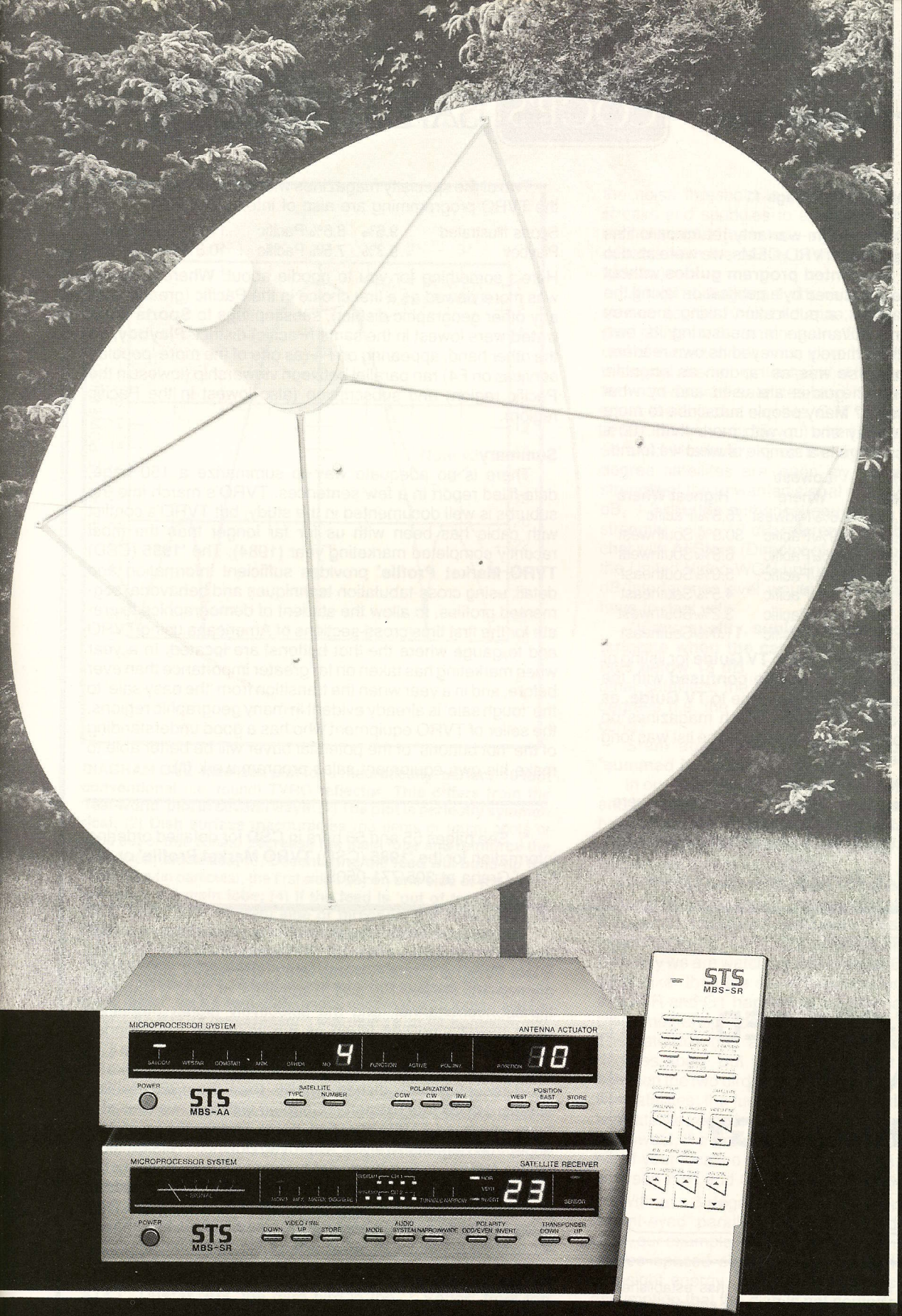

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MARKET PROFILE/ continued from page 11

universe selected at random from warranty return card files maintained by five cooperating TVRO OEMs, we were able to measure the impact of the **printed program guides** without any bias which might be introduced by a publication taking the survey itself. In other words, a publication taking a survey would have a profound advantage in measuring its own 'penetration' or 'impact' if it merely surveyed its own readers. Our 4,800 (+) user universe was as random as scientific random-could-be. So which guides are used and by what percentage of TVRO users? Many people subscribe to more than one guide so you may end up with more than 100% indication in the process. Here is a sample of what we found.

Guide/Publication	% Overall	Lowest/ Where	Highest/Where
Satellite TV Week	**49.8%**	40.6%/Midwest	76.5%/Pacific
Orbit Magazine	26.5%	9.9%/Pacific	30.9%/Southwest
Channel Guide	4.3%	3.0%/Pacific	6.8%/Southwest
Dish Magazine	3.8%	0.9%/Pacific	5.0%/Southeast
Local Newspaper	2.3%	1.3%/Pacific	4.5%/Southeast
TV Guide	1.7%	0.4%/Pacific	3.2%/Southwest
None Of Above	10.7%	7.8%/Pacific	11.0%/Southeast

The low percentage of people using **TV Guide** for listing or program data information should **not be confused** with the percentage of TVRO owners who subscribe to **TV Guide,** as another question revealed. We asked which magazines do TVRO owners subscribe to or read regularly. The list was long but here are the top performers:

Magazine	% Overall	Lowest/ Where	Highest/Where
Reader's Digest	**39.2%**	34.1%/Southeast	44.6%/Pacific
Better Homes & Gardens	28.0%	26.4%/Southeast	30.6%/Southwest
TV Guide	23.4%	18.7%/Pacific	26.1%/Southeast

Two of the specialty magazines with **direct association** to the TVRO programming are also of interest:

Sports Illustrated	9.6%	8.6%/Pacific	11.0%/Southeast
Playboy	9.3%	7.5%/Pacific	10.8%/Southwest

Here's something for you to noodle about. Whereas sports was more viewed as a first choice in the Pacific (greater than any other geographic district), subscriptions to **Sports Illustrated** were lowest in the same (Pacific) district. **Playboy,** on the other hand, appearing on F4 (as one of the more 'popular' services on F4) ran parallel between viewership (lowest in the Pacific region) and subscription (also lowest in the Pacific region).

Summary

There is no adequate way to summarize a 150 page, data-filled report in a few sentences. TVRO's march into the suburbs is well documented in the study, but TVRO's conflict with cable has been with us for far longer than the most recently completed marketing year (1984). The **'1985** (CSD) **TVRO Market Profile'** provides sufficient information and detail, using cross-tabulation techniques and behavorial segmented profiles, to allow the student of demographics to create for the first time cross-sections of Americana using TVRO and to gauge where the 'hot buttons' are located. In a year when marketing has taken on far greater importance than ever before, and in a year when the transition from 'the easy sale' to the 'tough sale' is already evident in many geographic regions, the seller of TVRO equipment who has a good understanding of the 'hot buttons' of the potential buyer will be better able to make his own equipment sales program work **(*).**

*/ See pages 55 and 56 here in **CSD** for detailed ordering information for the **'1985** (CSD) **TVRO Market Profile'** or call Carol Graba at 305/771-0505.

OFF-SET FED ANTENNA TECHNOLOGY

Going back to 1978 and before, Jim Vines has established a reputation with industry old-timers as a stickler for antenna performance. While his large and very rugged **Paraframe** antennas are being manufactured in Edmonton, Alberta for high-Arctic deployment, Jim is back home in Illinois where he is exploring new and novel antenna designs for the next generation of TVRO system hardware.

by
Jim Vines
611 Farmview Road
University Park, Il. 60466

With reduced satellite spacing forecast, uniformly across the Clarke Orbit Belt, one must ask 'how well will those 6, 7 and 8 foot TVRO antenna systems fare?' The higher output powers from the Galaxy 1 (2 and 3) satellites, of up to 9 watts per transponder/channel, and the selectively higher output on other newer satellites (such as 8.5 watts per transponder/channel on transponders 3, 7, 11, 15, 19 and 23 on RCA's F3R and F4) has certainly made it 'possible' to achieve remarkably good reception with dishes smaller than the 1983 defacto standard of 10 foot diameter. Coupled with this, we now also have improved LNAs boasting noise temperatures of well under 100 degrees K(elvin), improved downconversion techniques (also boasting lower-noise temperatures) and a better grip on receiver 'IF' bandwidths which ultimately results in improved weak signal system performance. However, as 2 (or even 3) degree spacing becomes more universal, is it enough for system installers to strive **solely for** threshold-equalling video???

The answer, in a word, is **no.**

Along the Atlantic seaboard and up through New England (plus eastern Canada), some ten foot dishes are already experiencing some difficulty 'discriminating' between F3R and Galaxy 1**(*). Sloppily constructed** 12 foot antennas are also having some difficulty 'seeing' one bird, or the other, without seeing **some of both** at the same time.

(Some installers mistakenly believe that because they can point a dish at G1, for example, and not actually **see** a weaker F3R picture 'drifting in the background' that their dish is ex-

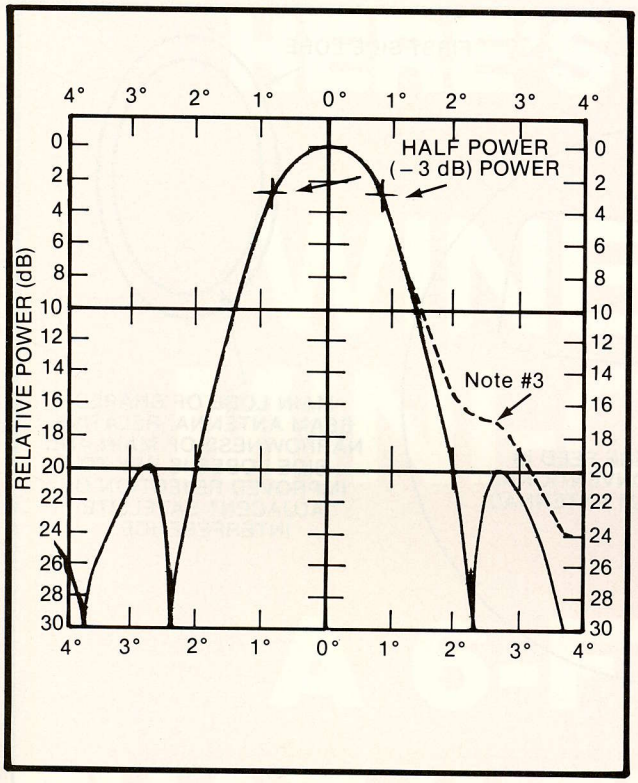

DIAGRAM ONE/ Idealized plot for a theoretically 'perfect' 10 foot conventional (i.e. round) **TVRO reflector. This differs from the 'real-world' plot in several ways:** (1) **The plot is perfectly symmetrical;** (2) **Dish surface inaccuracies** (no dents or rough spots or large out-of-true zones) **decrease the main lobe and reinforce the** (unwanted) **sidelobes;** (3) **Decentering the feed will build-up the sidelobes** (in particular, the first sidelobe) **on one side or the other, reference the main lobe;** (4) **If the feed is 'out of focus' on the 'long'** (away from the dish) **side or direction, the main lobe will decrease rapidly and the sidelobes will increase rapidly.**

For an 8 foot diameter antenna the width of the main lobe and the locations of the sidelobes will be broadened by a factor of 5/4 or 1.25; relative to a 10 foot round reflector surface. The 'broadening factor' for a 6 foot dish (again, relative to a 10 footer) **will be 5/3 or 1.67. It is for these reasons that using a small, conventional dish with reduced satellite to satellite spacings can be hazardous to your TV picture's health!**

hibiting adequate 'adjacent satellite discrimination'. Only in the worst and most severe situations will you actually **'see'** a drifting set of video 'in the background,' or, a weaker set of adjacent-bird transponders laced in between and behind the desired bird transponders. What you do experience, **long before you** 'see' **video interference,** is a gradual increase in 'noise level' caused by the signals from the adjacent bird. In the real world, this adjacent satellite 'signal energy' increases the noise threshold in your receiver [system] and causes streaks and sparklies to appear on the desired video. You cannot 'resolve' [as in tune-in] this information but its presence detracts from the quality of the picture you are attempting to tune-in.)

A look at **diagram 1** shows the typical profile for a precision-contoured 10 foot antenna. In this example, the ±2 degree points for the antenna are '20 dB down' on either 'shoulder' of the antenna's main lobe. If we have a situation where the signal strength or 'footprint' of the desired satellite **plus** the two non-desired satellites on either side (±2 degrees) is equal, the adjacent satellite 'C-N' or carrier to noise ratios will be 20 dB weaker or 'down') when compared to the 'boresight ed bird.' **However,** since the signals from **both** of the ±2 degree satellites are 'seen' by the antenna, the effective strength of the unwanted signal energy is now doubled; −20 dB, +3 dB (the numerical equivalent of doubling the signal strength) = 's −17 dB; reference the 'boresight bird.' A quick chat with **Al Stem** (Director of Operations and Engineering at the United Video WGN uplink station) confirmed that a −17 dB 'interference level' would be a problem that the user would have to deal with.

"Video quality, subjective video quality, begins to deteriorate when the carrier-to-interference ratio or C to I falls below 18 dB" Stem observed. And what about those other satellites; the ones that are 'off boresight' by say ±4 degrees (i.e. the next set of birds removed from true adjacent)?

Stem again: **"Their signal power also must be 'summed in' to the equation."**

In our example, the ±4 degree points (on the extreme left and right sides of the plot) are down by 26 dB. The 'sum' of both together is −23 dB, for the same reason we reduced the −20 point by 3 dB when we paper-placed two satellites around our boresight satellite.

Then we combine the sum of the ±4 degree birds (−23 dB) with the sum of the ±2 degree satellites (−17 dB) and we find that our total 'C to I' relationship has now decreased to the region of 15 dB. Let's look at some closer-world examples. Let's say we are watching transponder 6 on F3R. It is at least 2 dB weaker than the same transponder on G1 **(overlooking** that F3R and G1 **happen to be** alternately polarized so that the same transponders are not directly battling one-another). The satellites (G1 and F3R) are assigned orbital spots 3 degrees apart. But you will have that 3 degree separation between the two birds only if you are close to being north of the two satellites; the further east and south your location, as the two satellites drop lower and lower towards the horizon to your southwest, the closer they 'appear' to be together. For example, if your location is Southern Florida, the actual difference between F3R and G1 is just over 2 degrees today!

With a ±3 degree spacing situation, not modified by the 'squint-eyed' parallax of being 'around to the side' of boresight, our example (10 foot diameter) antenna would find the 3 degree spaced signal energy some 18 dB lower than the boresight energy. This number makes the not always valid assumption that the dish is not contorted (a dish with surface distortion will also have a 'warped' signal receiving pattern), the feed is properly adjusted and the dish is aimed accurately.

The same knowledge tells us that a good quality **8 foot** antenna will be likely to have ±2 degree spaced signal energy down 14 dB relative to the boresight pattern. The 'best null' or maximum rejection for our 8 footer will fall at a point roughly ±3.5 degrees away from boresight. And the signal rejection for a set of signals ±4 degrees will be about 26 dB.

---

*/ At press-time a far more imposing threat was offered by AT&T. **Telstar 303,** the third bird in the 'T Series' from the same folks who brought you Comstar, had requested FCC permission to locate at 128.**5** degrees west; a scant **2.5 degrees** east of F3R (131 west). AT&T, owner of the Telstar series, is replacing Comstar D4 (127 west) with the new T series bird and some 'minor adjustment' of location, for T303 was anticipated. What was not anticipated was a request to move T303 down to a point only 2.5 degrees away from the popular F3R bird.

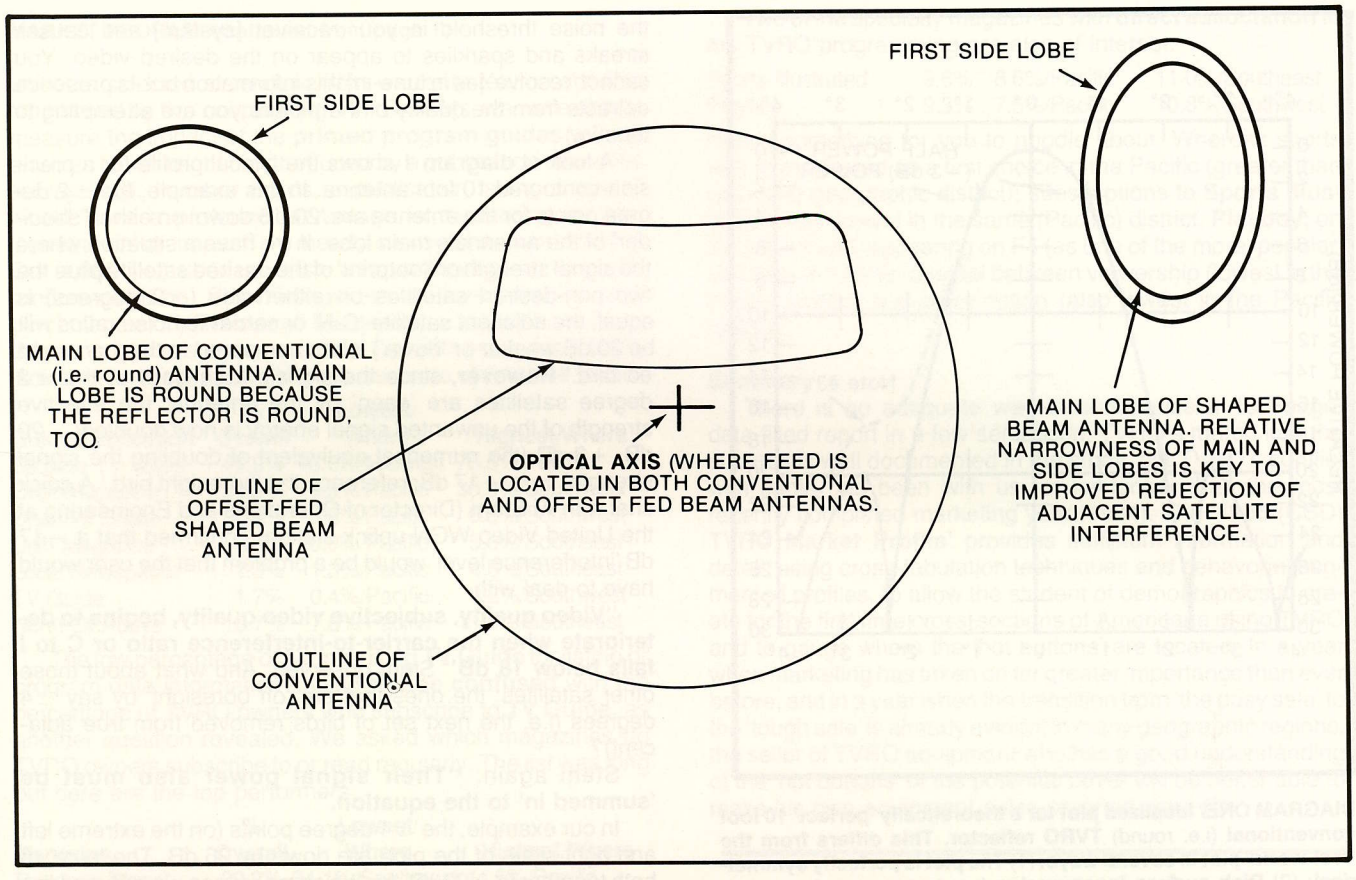

DIAGRAM TWO/ Comparison of a conventional antenna and an offset-fed shaped beam antenna. With the shaped-beam design, the reflector is a rectangular section 'carved from' an imaginary larger parabolic dish. Because the feed structure and its support members do not obstruct the incoming parallel ray 'bundle,' sidelobes are attenuated and more energy is concentrated in the main lobe, resulting in higher gain per unit of reflector area.

So when all of the 'summing' is down, allowing for the appearance of **two signals** (plus and minus 2 degrees; plus and minus 4 degrees) **on each sidelobe** (left and right), we find that the completed 8 foot C to I will be 9 dB; assuming **equal signals and the same polarization** of all signals for all five birds.

Not good; and we haven't yet considered the 'fate' of a 6 foot antenna. Perhaps there is a 'way' out of the woods. That 'way' has been called 'beam shaping.' For more than 40 years now military (and non-military) radar systems have used 'beam shaping' so the concept is hardly new. But, the application of beam shaping to the 4 GHz consumer microwave world has had very few practitioners to date.

Diagrams 2, 3 and 4 compare and contrast various aspects of conventional and shaped-beam antennas. We will make several generalizations about these diagrams:

- **A)** A shaped beam reflector is merely a small section 'taken out of' an imaginary, larger, parabolic reflector;
- **B)** A broad reflector always produces a narrow shaped beam;
- **C)** It is desirable to maintain the 'shaped' main lobe perpendicular to the Clare Orbit Belt for maximum protection from adjacent satellite signal energy, and hence, interference;
- **D)** And, the relative 'tallness' of the shaped beam antenna's main lobe makes polar alignment less critical (a topic for future discussion).

To this point, we have talked about a **small** offset fed, shaped beam antenna system. One manufacturer to date, **PICO Products,** has introduced such an antenna. The Pico antenna measures 4 feet by 7 feet and has a published gain specification of 37.0 dBi (which translates to a claimed gain efficiency of 86%).

Now, 37.0 dBi is a tad shy for most work, **but** it is 1.3 dB more than an equal-surface-area conventional dish (with blockage from feed and feed supports) is able to deliver. For applications that require a small antenna, this is one of the few apparent ways to have even 37 dBi of gain (an equally efficient 10 foot antenna would have a gain of 41.5 dBi!).

One of the evolutionary problems associated with a shaped-beam antenna is the illumination or 'feeding' of the reflector surface in the two planes of energy; E and H. A pyramidal feed horn of rectangular cross-section is required (this is one antenna where the always popular Polarotor will not work!). Such a feed cannot easily be 'skewed about,' so another approach to switching polarizations had to be designed. The technique created came from feed guru **John Seavey** whose company Seavey Engineering Associates (Cohasset, Ma.) supplies the PICO feed.

The pioneering work done by PICO, and Seavey, points at what may ultimately become an entirely different family of TVRO antennas with applications not yet dreamed about. For example, the world of international reception, via the weak-in-signal-level Intelsat birds, requires antennas of at least 20 feet

OFFSET FED ANTENNAS/ continues on page 24

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The Winegard Mini-Ceptor™ pictured here combines versatility and performance no other 6-foot satellite antenna can match.

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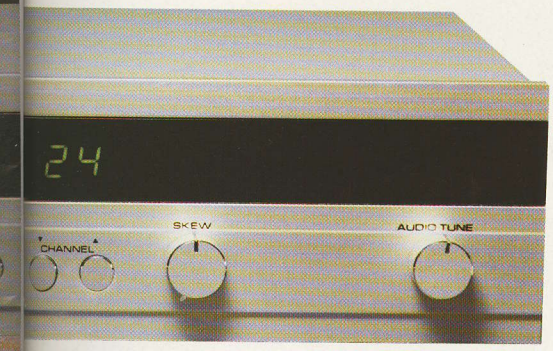
REACHES NEW HEIGHTS IN 6-FT. TECHNOLOGY

Opens New TVRO Markets . . . Solves Installation Problems Bigger Antennas Can't.

Sure you've had good success selling 8, 10 or 12-foot satellite antennas. Sure you've heard about six-foot models. And you might be leery. Maybe even convinced (without ever trying one) that reception quality isn't good enough to satisfy your customers. Let's set the record straight.

Does a six-footer work as well as a "ten" on all satellites and on all transponders? The answer is no. Is it true that some six-footers work better than others? Yes. Like the Winegard Mini-Ceptor with an unbelievable F/D of .278.

Winegard's Mini-Ceptor™ is designed and manufactured to the same precision standards as our 10-ft. perforated aluminum "deep dish."



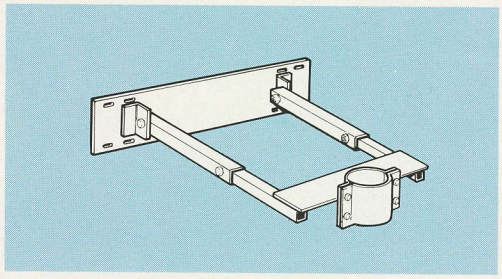
Model RF-1000
Patent Pending

In test after test, in all parts of the country, the Winegard Mini-Ceptor pulled in beautiful, clear pictures on most satellites and on 50 channels or more. Yes, there were minor sparklies on a few transponders, but good, watchable pictures nevertheless.

So what are we saying? How can you sell a six-footer against a ten? The answer is, you don't.

The Winegard Mini-Ceptor has a niche all its own in the home satellite market.

1. Many folks would like satellite TV in their homes but simply don't want a big, obtrusive dish. The small Winegard Mini-Ceptor, with its perforated aluminum see-thru construction, is probably the least obtrusive and most aesthetically pleasing satellite antenna on the market today.
2. Other home owners simply don't have yard space for a large dish. The Winegard Mini-Ceptor solves this problem.
3. In some cases, you can't get a good "look angle" without installing the dish above roof height. The Mini-Ceptor also solves this problem. It can easily be mounted on a ground-up pole mount (see photo). Its small size and light weight (22 lbs.) mean easy installation and far less wind loading than a larger antenna.
4. There are plenty of consumers out there who will be amazed and pleased with 50 or so satellite channels with good, watchable pictures from a small dish. All they need is a live demonstration.



Adjustable Winegard bracket attaches to roof edge or side of house, allowing easy "ground-up" mounting of Mini-Ceptor on standard 2-1/2-inch pipe.

So if you've had hang-ups about trying - and selling - six-foot dishes, try the new Winegard Mini-Ceptor. And, if you're already selling a six-footer, give Winegard's a test. It will soon become an important, profitable part of your product line.

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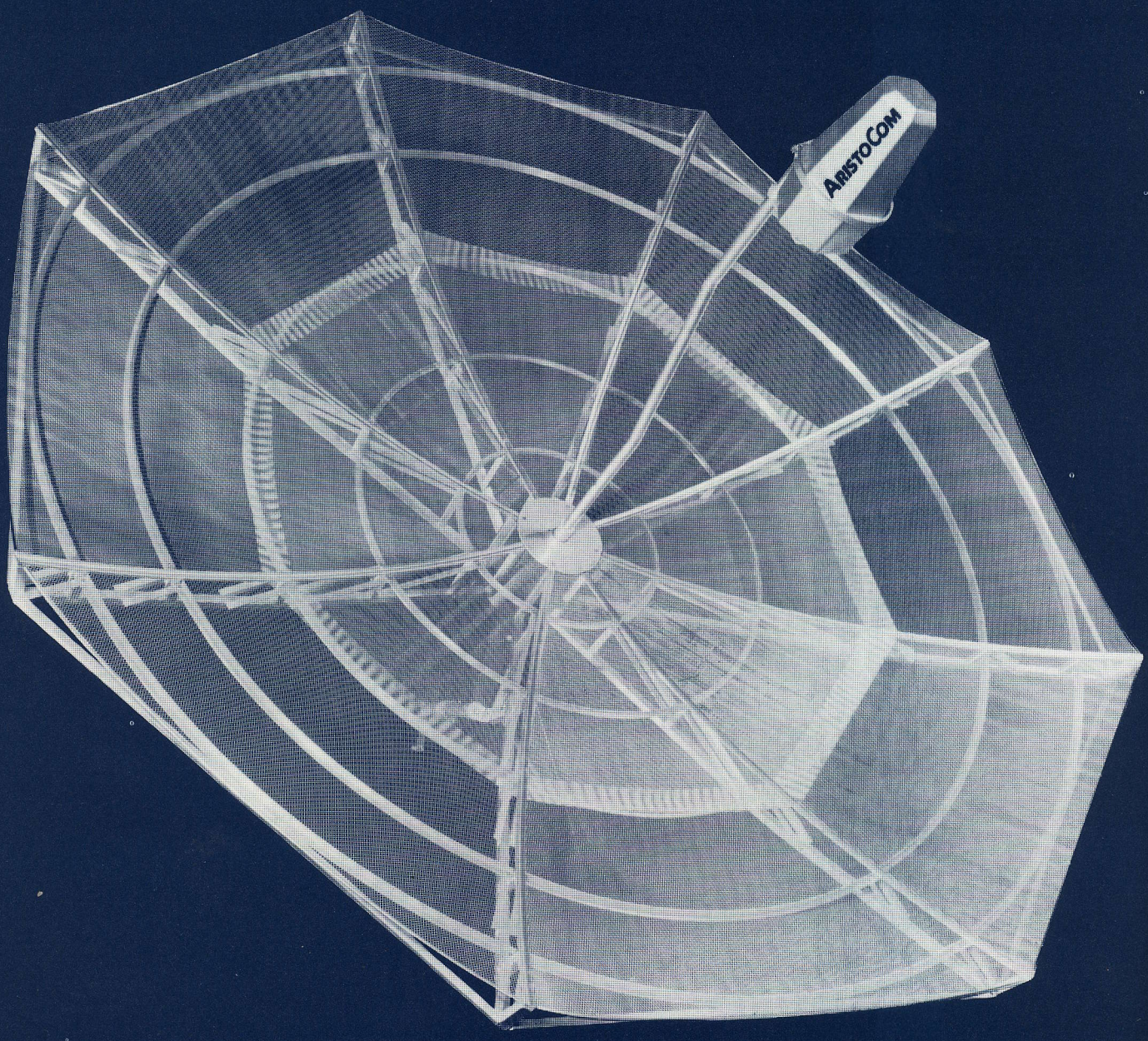

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There's also our UST-6000. An incredibly reliable mid-priced blockdown receiver that offers all the features of the UST-5000 plus convenient handheld wireless remote control and full stereo sound.

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All in all, an incredible array of features, functions and models. All with block downconversion and at competitive prices, making it easy to multiply your profits by selling multi-receiver systems to families with more than one TV.

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It will do amazing things for your bottom line.

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Win with Uniden in '85.

PIONEER MEMBER OF SPACE

OFFSET FED ANTENNAS/ **continued from page 16**

diameter if the user wants to access any but the strongest transponders. If, through increased antenna efficiency, Intelsat reception were practical with say 12 or 14 foot antennas, then an entirely new level of interest (and sales) might follow.

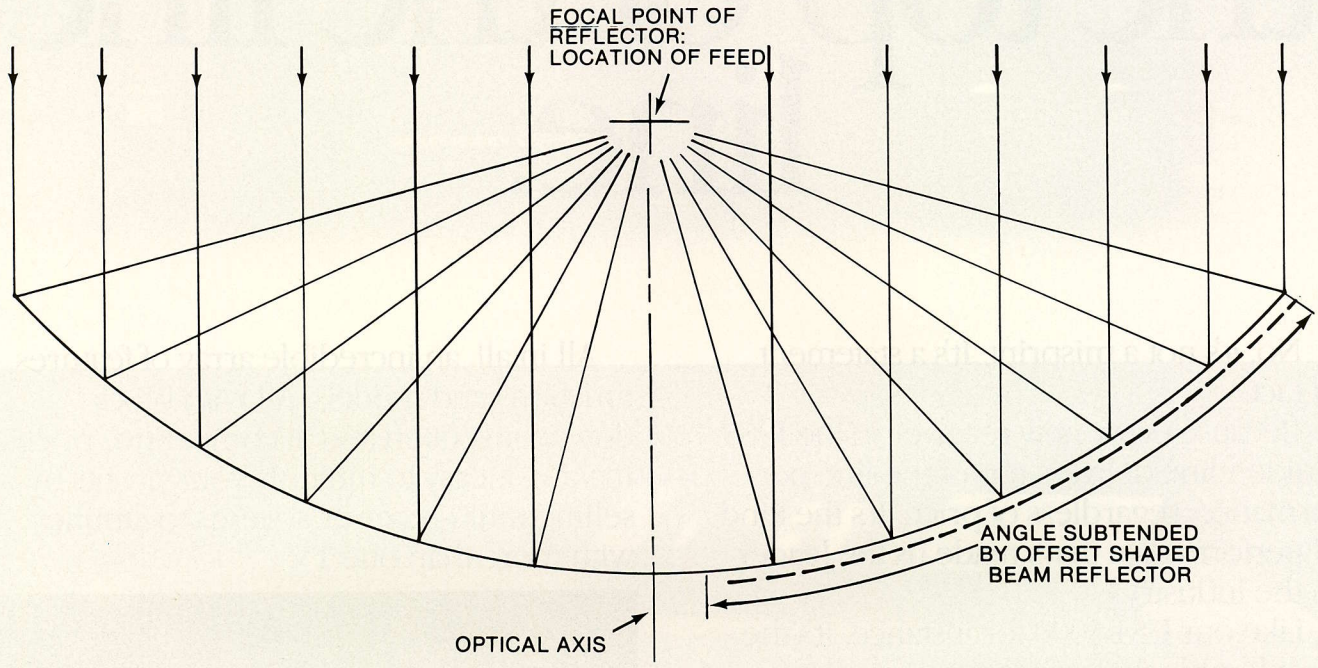

DIAGRAM THREE/ Comparison of conventional and offset fed shaped beam reflectors. A shaped beam reflector is merely a 'section' from a conventional parabolically-contoured reflector. It can be seen that the feed (and therefore the feed supports) **are outside of the portion of the incoming parallel ray 'bundle' which strikes the** (dotted) **offset portion of the reflective surface.**

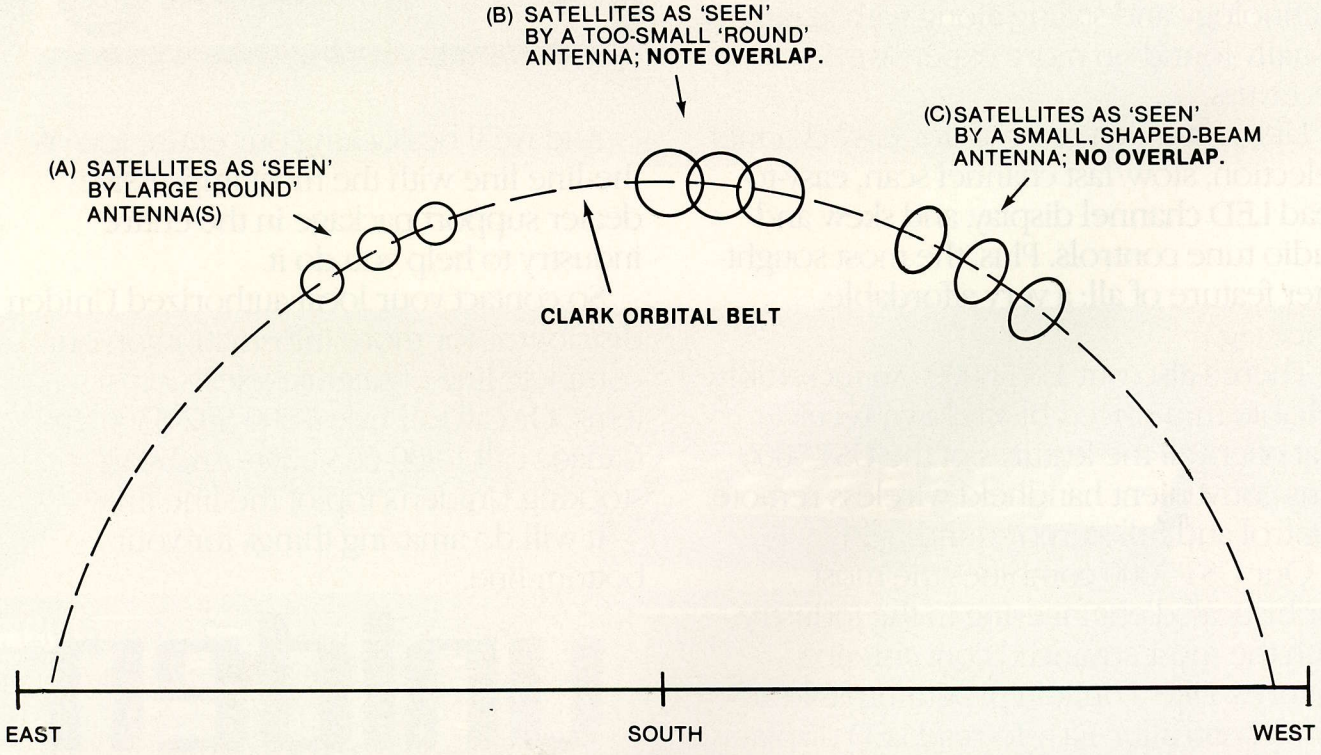

DIAGRAM FOUR/ Comparison of how (A) **large conventional antennas,** (B) **small conventional antennas, and,** (C) **shaped beam antennas will 'see' closely-spaced satellites. 'Overlap' between beams means increased adjacent-satellite interference. For maximum rejection of interference from adjacent satellites, the shaped beam must be kept perpendicular to the Clarke Orbit Belt. The simplest way to maintain 'perpendicularity' is to utilize a** (modified) **polar mount.**

Uniden receivers have met their match.

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The alert dealer will keep his 'mind open' and continue to study with interest all of the new products brought to market. As the retail world increases in complexity and as competition stiffens, the dealer who is long-term profitable will discover that he has maintained that posture because he has kept himself and his facility up to date on the ever improving technology.

SCRAMBLING/

(Part Three)

NOTE: This series began in **CSD** for May 1st with a general overview of the M/A-Com VC series descrambler units intended for the home TVRO marketplace. The May 15th issue of CSD/2 addressed the IRD or VC2000**M** 'electronic brick' module intended as an 'in-receiver-housing' unit which would supply video and audio descrambling for receivers equipped to accept the IRD unit.

by
Alli Lake
The Satellite Link
Fort Lauderdale, Florida

INTERFACING To The Receiver

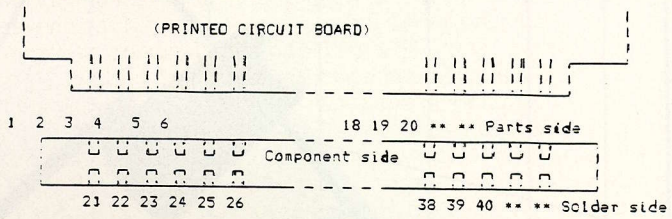
There is a considerable reliance on 'logic circuits' in the Videocipher scrambling system and most of the interfacing between the IRD unit and the 'host receiver' is done using something generously known as 'TTL Logic.' Linkabit has made the assumption here that interfacing commands and instructions originating in or coupled to the IRD unit can be reduced to electronic 'logic circuits.'Certainly that is the modern way to conduct 'signaling' between two related pieces of equipment, but it must be pointed out that not all existing (TVRO) receivers employ TTL or any other form of 'logic' in their normal operations. This suggests that those receivers which presently function without some form of 'logic base' will have to be extensively redesigned to take the IRD logic feeds.

The Videocipher sync signal, for example, is a 'TTL Level Signal.' The TTL logic signal is 'high' in the presence of an unscrambled signal and is 'low' in the presence of a scrambled signal. The reason given for this approach to 'sync signaling' is that in the absence of an IRD Unit inside of the receiver, the IRD will simply make the ('logical') assumption that an UNscrambled signal is present; and bypass the IRD unit accordingly.

The combination of an IRD unit installed inside of the receiver **and** a scrambled signal present causes the TTL signal to go 'low' and that in turn initiates a switching sequence within the IRD unit.

Each IRD compatible OEM will be required to provide connection points within the receiver for something called the 'data' and 'clock' lines. As we visited on our **BORESIGHT** review during April, and in **CSD/2** for April 15th, the primary 'in-the-future' reason why 'data' and 'clock output' lines or functions are even present is for the anticipated use of the satellite service for the transmission of high speed (88 KBps) data. Some of the OEMs present in La Jolla found it 'interesting' that if their firms agreed to provide for the IRD unit, they would be required to provide 'connection points' and 'terminals' for the IRD 'data' and 'clock' lines so that at some future date a user could connect some yet-undefined piece of equipment to the 'data' and 'clock' connection points.

C.1 Pin Connection Arrangement



(Connector view from pin side, the mating connector must be Amphenol 225D-10022C2-2313 or equivalent)

Pin No.	Signal	Pin No.	Signal
1	Utility Clock	21	Utility Data
2	+ 5 Volts Digital	22	+ 5 Volts Digital
3	Digital Ground	23	Digital Ground
4	IR Enable	24	Stereo Disable
5	Serial Data to VCIIM	25	Serial Data from VCIIM
6	VC Sync	26	Spare 2
7	Reserved for testing	27	Digital Ground
8	CMOS High	28	Digital Ground
9	Digital Ground	29	- 5 Volts
10	+ 5 Volts Analog	30	Audio Ground
11	Audio Ground	31	MONO Audio Out
12	Right Audio Out	32	Audio Ground
13	Audio Ground	33	Left Audio Out
14	Audio Ground	34	Audio Ground
15	Video Ground	35	Video Ground
16	Video Out	36	Video Ground
17	Video Ground	37	Video Ground
18	Video In	38	Video Ground
19	Video Ground	39	Video Ground
20	+ 12 Volts	40	- 12 Volts
**	Reserved for future use	**	Reserved for future use
**	Reserved for future use	**	Reserved for future use

44 PIN interconnect required by Linkabit for IRD connections to the basic TVRO receiver; note pins 4 ('IR disable') **and 24** ('stereo disable'); drawing and table courtesy of M/A-Com.

Also mandatory, on the part of each receiver OEM agreeing to build in provisions for the IRD unit, are facilities to handle the text and message capabilities of the IRD unit and Videocipher system. There must be a 'serial data stream' present between the IRD unit and the receiver proper and that simply means that the (TVRO) receiver designer must build into his receiver a **'microprocessor'** if he intends to be in the 'IRD business.' Several receiver OEMs who had not elected to build-in microprocessors found this to be another hurdle when placed within the "$2 to $15" estimate of Linkabit for receiver compatibility.

PRICING And Delivery

Although at the time of the La Jolla meeting M/A-Com had no orders for the VC2000M (IRD) unit, they were ready to talk terms and delivery. The price for the IRD unit would be $150 per system although no minimum quantity order had been

defined at that time. This price was 'FOB' the plant, in Puerto Rico, and Linkabit suggested that shipment via surface transportation might average $5 per unit, or $10 to $15 per module for air freight, in significant quantities.

The standard product warranty period would be **120 days** and that raised some problems.

A) If a TVRO receiver was warranteed for 12 months, how could the TVRO manufacturer accept a 4 month warranty on the IRD unit? The manufacturers saw complex problems with handling warranty returns if a significant portion of a receiver, not of their own manufacture, carried a shorter warranty coverage period.

One possible answer 'floated' during discussion was that by paying Linkabit 'more money' per unit, the warranty term could be extended to the same period (12 months) as the basic receiver itself.

M/A-Com was hopeful of having their first IRD unit orders in hand by the 1st of June and they reported a 'production capacity' of up to 150,000 units per month.

TESTING Of IRD/Receiver Packages

One significant problem, not limited to the IRD unit but making selection of the 'IRD/VC2000M' approach more difficult for off-shore producers, also surfaced in La Jolla.

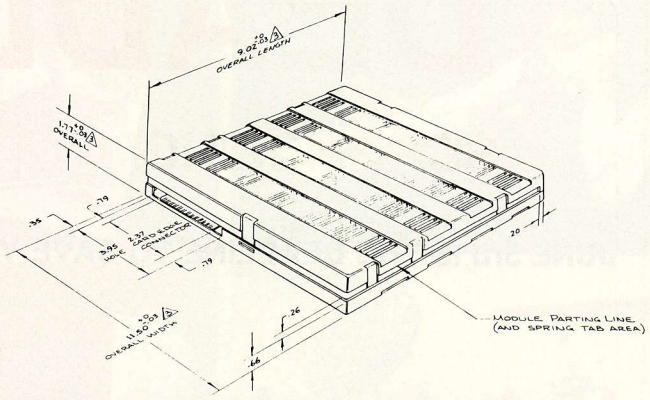
M/A-Com insists that they have created a standard which insures that if the TVRO receiver has a carrier to noise ratio at the input (at 4 GHz) of 9 dB or better, the receiver will properly **(1)** address, **(2)** 'take instructions' (such as being 'downloaded' with the correct pre-payment amount that was 'banked'), and **(3)** descramble the video and audio signals. They have created a **test system** to measure the individual receiver's capability to do all of these things and they build this test sequence around transmitting a high speed data stream to the receiver and then measuring (automatically with a computer) the **'bit error rate'** of the data stream received and decoded. The bit error rate which is 'acceptable' is something called 10^{-3}.

To do all of this, the receiver OEM must invest in a 'test system.' No price was offered but if the La Jolla test sytem used for the demonstration, or the Las Vegas in-booth system demonstrated by M/A-Com was any indication, upwards of $150,000 could be invested in this test package by the receiver OEM. As substantial as that might be, for the receiver OEM to have full IRD test capability, there were more severe problems for off-shore producers.

The special code created for the scrambling system is something called the 'DES Algorithm.' The basis for this sytem is a technique created with the assistance and backing of the United States government, and in other encrypted fields of endeavor the 'secret' to the 'DES System' is protected by the National Security Agency. In other words, the U.S. Government has an invested stake in the entire basis for encryption and no significant parts of the system may be exported outside of the United States (plus Canada); **period.**

To allow a foreign supplier of (TVRO) receivers to acquire a test set to be used on their own production line, in say Japan, would be a violation of the security provisions surrounding the DES encryption system. Several representatives of foreign OEMs, on hand in La Jolla, were plainly upset that they were being told that if they were to continue in the TVRO marketplace AND be a part of the IRD system, they would have to establish separate receiver testing facilities within the United States since the DES 'test sets' could not leave the USA. This appeared to be both an unnecessary expense and a competitive handicap to these suppliers who would prefer to do all of their production AND testing in their country of origin where they have certain controls over labor rates and production efficiencies.

A supplemental problem not addressed in La Jolla was the export of any TVRO receivers equipped with the IRD unit, or



PARTIAL Packaging diagram of proposed IRD unit for interfacing within 'slot' established by TVRO receiver manufacturer; drawing courtesy of M/A-Com.

the stand-alone VC2000E unit. There have been a number of product export problems associated with TVRO hardware designed to operate above 960 MHz in recent years and some suppliers saw a brand new problem coming if receivers equipped **for an IRD unit** but not actually containing the IRD unit were stopped at points of export from the US while the shipper had to 'prove' that no IRD units were installed within the receivers stacked up for export.

One OEM who thought he saw a way to save his firm some money wanted to know if he could order VC2000M (IRD) units (at the $150 price) and then build his own VC2000E type 'stand-alone' units. The $325 announced price for the stand-alone units seemed 'high' to many in La Jolla and several felt that they could build a stand-alone unit for far less than that (M/A-Com to them cited) cost **if they could acquire** the IRD units for this purpose. The answer was a flat 'no'; only M/A-Com would be building stand-alone units and no one else would be permitted to build stand-alone units.

MISCELLaneous Observations

With all of that highly compact digital circuitry crammed into a very tight plastic-enclosed container (the IRD unit), concern was voiced about the possibility that the high speed logic circuits could generate 'RF interference' which might somehow create reception problems for other portions of the receiver.

Mini and micro computers have this 'problem' and it has taken a number of years to pin down both the causes and the cures to such problems. Operating a Commodore 64 computer, for example, in relatively close proximity to a television receiver or an FM (broadcast band) receiver or any shortwave receiving equipment often results in interference generated within the computer getting into the nearby receiving equipment.

Discussion of this in La Jolla, pointing out the microprocessor based data exchanges between the IRD unit and the receiver proper, led to speculation that perhaps a considerable amount of **'additional RF shielding'** will be required

SCRAMBLING/ continues on page 30

URGENT

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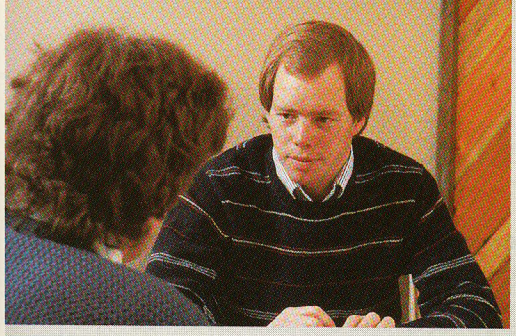

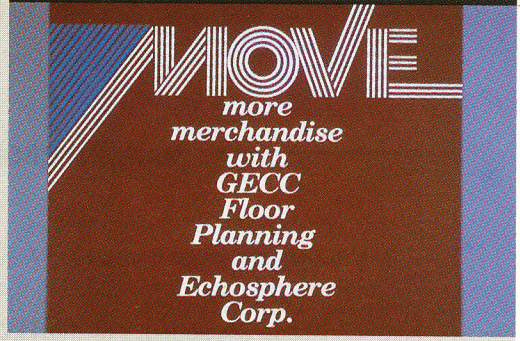

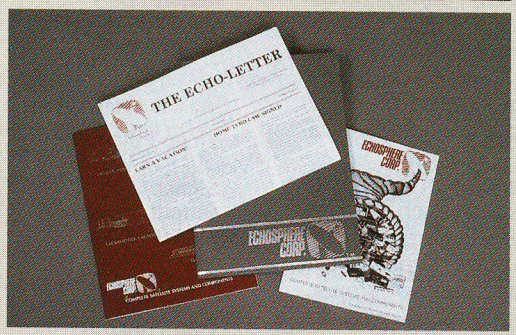

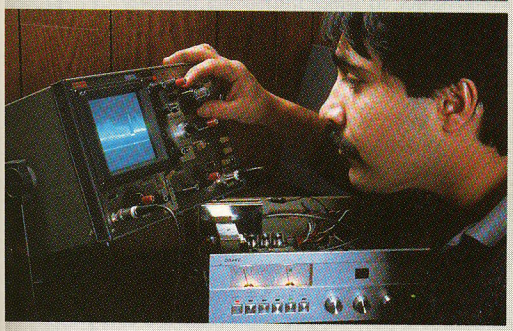

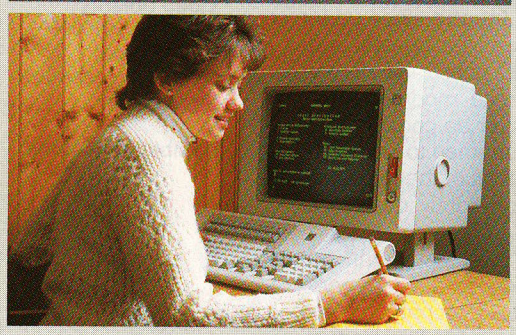

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SCRAMBLING/ continued from page 27

within the TVRO receiver. This could take the form of a 'screened cage' designed into the (TVRO) receiver which would shield the IRD unit from the balance of the receiver. Such a cage would, however, reduce the much needed air flow and ventilation of the IRD unit and the receiver proper thereby increasing the heat and heat dissipation problems associated with adding the IRD 'to' an existing receiver design.

Power supply leads, from the new generation 2.5 amp or so power supply that would be required within each receiver, would also have to include extensive RF filtering to prevent the transmission of interference through the power supply wiring to either the IRD unit or the balance of the receiver proper.

M/A-Com took the position that 'interference' was the 'problem of the receiver OEM' **and not Linkabit** since under FCC rules the prevention of interference was the legal responsibility of the manufacturer of 'completed units' and not the responsibility of those who 'merely make modules.' The VC2000**E,** stand-alone unit, would however be considered a 'completed unit'; and, nobody in La Jolla seemed to know the status of FCC approval of that unit at the time of the meeting.

'The future' designs were touched on lightly during the meeting and we learned the following:

1) The present 11.5 by 9.02 by 1.77 inch size **will not shrink** in the near future. The next size-down generation will occur when there is 'VLSI' technology and products available and VLSI, as applied to this product, is a function of first volume and second time. Therefore receiver OEMs accepting the present IRD/VC2000M module can anticipate that their new receiver designs to mate with the IRD unit will be useful for 'several years.'
2) A future version of the IRD unit **may** ALSO include a telephone modem so that the (HBO et al) subscriber's telephone can be 'jacked' directly into the IRD unit. The concept here is that a viewer, enticed to order up a 'pay-per-view' program, should be given maximum 'ease of ordering' of events and also be given a minimum of 'hassle' in paying for the event. The concept broadens to envision a subscriber having his or her; credit card information 'memorized' by the IRD unit and when a particular telecast requiring 'payment-per-event-viewing' comes up and is selected, the customer would merely punch in a couple of keys on the receiver and then automatically the telephone modem connection would dial up the toll free number and the IRD unit would 'talk' to the computer at the ordering desk. The ordering desk would 'extract' the customer's credit card number from the IRD memory, and in turn it would send a signal back (via satellite) to the IRD unit authorizing the viewing of the event.
3) An additional version of Videocipher, reportedly **not related to** the decryption of satellite encrypted signals, will be introduced to the cable television marketplace next. This will be a cable (set-top) converter unit which allows the cable operator to address and selectively decode specific programs or channels for the cable customer.

In the May 15th review of the IRD or VC2000M module, we learned that there had been pressures exerted on M/A-Com to insure that the largest possible TVRO receiver 'universe' would be able to descramble the Linkabit system signals. Tests conducted by Linkabit, using the 'bit error rate' approach, convinced M/A-Com that a large number or a high percentage of the receivers now in the field would not accept the Linkabit 'coding.' As we learned in **CSD/2** for April 15th, **tests conducted by CSD indicated to us** that the 'basic descrambling protocol' **would function** with even low-end, poorly designed TVRO receivers. However, as we subsequently learned in **CSD** for May 1st, it is not merely the de-

IRD UNIT TECHNICAL SPECIFICATIONS

Video to VCIIM/

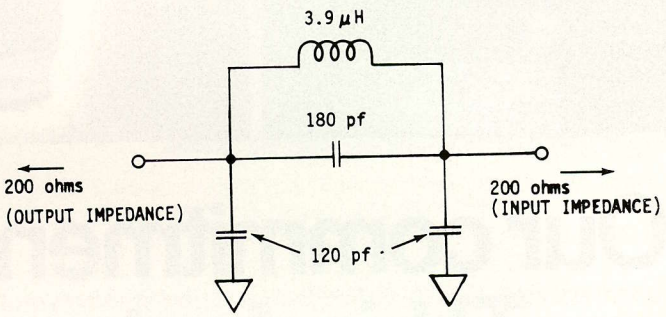
Signal Type:	Scrambled or unscrambled NTSC
Output Impedance:	100 ohms or less
Signal Level:	1 volt peak to peak nominal, de-emphasized, AC coupled into 1,000 ohms impedance **(VCIIM has ± 3 dB AGC window)**
Video Polarity:	Black to white transitions positive

Video From VCIIM/

Signal Type:	Descrambled NTSC
Output Impedance:	30 ohms nominal
Signal Level:	1 volt peak to peak corresponding to 140 IRE units with a 2,000 ohm load; DC coupled (0 IRE = −0.7 volts nominal)
Video Polarity:	Black to white transitions positive

Audio From VCIIM/

Signal Type:	Baseband audio
Output Impedance:	1,000 ohms or less; DC coupled
Signal Level:	± 1.2 volts, 2.4 volts peak to peak into **15,000 ohms** impedance
Number of Outputs:	Three (monaural, left and right)



NOTES: 1. COMPONENT TOLERANCES ARE ± 10% FOR INDUCTORS AND ± 5% FOR CAPACITORS.

2. IMPEDANCE OF THE FILTER CAN BE CHANGED TO OTHER THAN 200 ohms. IN THIS CASE, THE COMPONENT VALUES MUST BE SCALED ACCORDINGLY.

LOWPASS filter suggested by Linkabit for insertion between the output of the (CCIR) deemphasis network and the input to the VCIIM; drawing courtesy of M/A-Com.

Videocipher Sync, Stereo and IR Enable/

Signal Type:	Static logic
Signal Levels:	TTL high — 2.3 volts minimum at 0.04 mils current drive 4.0 volts minimum at 1 microamp current drive TTL low — 0.6 volts maximum at 0.4 mils current drive
Sync:	When TTL is low, from videocipher sync signal, video output goes to video input spigot;

When TTL is high, from videocipher sync input, video output goes to VCIIM video input to provide descrambling

Serial Data to VCIIM/

Signal Type: Serial digital data

Signal Level: TTL high, 2.3 volt minimum at 0.04 mils current drive or 4.0 volt minimum at 1 microamp current drive
TTL low, 0.6 volts maximum at 0.4 mils current drive

Utility Data/Clock/

Signal Type: serial digital data at 88 kilobits per second and an associated clock

Signal Level: TTL high, 2.4 volts minimum at 0.4 microamps current drive
TTL high, 0.5 volts maximum at 8 mils current drive

Power (to be provided to VCIIM)/

DC Input	Typical	Maxium
Digital +5V:	0.85 amps	1.10 amps
Analog +5V:	0.05 amps	0.08 amps
(Analog) −5V:	0.1 amps	0.14 amps
(Analog) −12V:	0.14 amps	0.15 amps
(Analog) +12V:	0.05 amps	0.065 amps

Voltage Accuracy/

± 5% maximum over full life of unit under all operating conditions including line variations (115 VAC ± 10%; 60 hertz ± 5%), ripple and noise at typical load of ± 20% (with maximum load).

Ripple/

100 millivolts peak to peak maximum for digital +5 volt line
10 millivolts peak to peak maximum for analog +5 volt line
5 millivolts peak to peak maximum for −5, −12 and +12 lines

Keyboard/

The receiver must have either a remote function keyboard (i.e. handheld remote control) **OR have a keyboard built into the receiver proper** so that the IRD using consumer can properly initiate commands and make responses to 'prompt questions' presented to the user on the screen. A total of 24 'key functions' **are required** as follows:

SAT/TV	Selects satellite or local VHF mode
CHAN	used for direct channel entry (transponder)
0-9	numeric keys
MUTE	mutes the audio
VOLUME UP/DOWN	increases or decreases volume
CHANNEL UP/DOWN	changes channel (transponder) number
HELP	**'Reserved'** for VCIIM dictated use
PREBUY	**'Reserved'** for VCIIM dictated use
VIEW	**'Reserved'** for VCIIM dictated use
MESSAGE	**'Reserved'** for VCIIM dictated use
SET UP	**'Reserved'** for VCIIM dictated use
TEXT	**'Reserved'** for VCIIM dictated use
CONFIRM	**'Reserved'** for VCIIM dictated use
DELETE	**'Reserved'** for VCIIM dictated use
UP-ARROW	**'Reserved'** for VCIIM dictated use
DOWN-ARROW	**'Reserved'** for VCIIM dictated use

scrambling of the video which counts; it is also the descrambling of the digital data stream which is necessary for the proper operation of the 'accounting' and 'banking system' of the Linkabit scrambler package, as well as the future availability of 'electronic newspapers' and 'electronic magazines' via Linkabit.

We also learned on May 15th that when the bit error rate is 'high,' or there are gaps in the data stream delivered to the descrambler, that several undesirable things **may happen.** Among them are:

1) Excessively long 'lock up periods' for the authorized descrambler; with a 5,000,000 descrambler universe it is reported that a descrambler might be required to wait two full days just to be properly addressed by the scrambled program controller; and, if the one individual bit of data addressed to that single descrambler was missing, or lost because of a receiver glitch, another two-day period might pass before the individual descrambler again was sent a message;

One of the little noticed requirements for the Linkabit system was their recommendation that all descrambler packaged terminals be left operational with the TVRO antenna pointed at Galaxy 1 while the receiver is left running (perhaps in a stand-by mode) on a designated (scrambled) channel. In other words, to insure that the individual descrambler does 'get the message,' even when the owner of the TVRO is not home to accept the message or is not using the terminal, the terminal **(they recommend)** should be left 'tuned in' to the scrambled channel.

We also learned in the May 15th issue of **CSD/2** that the people at showtime/The Movie Channel are 'taking credit' for insisting to Linakbit that the basic descrambler units have 70 MHz input capability in addition to the more standard baseband video input. This is an important consideration, especially with the proposed VC2000E 'stand-alone' package which Linkabit says they will sell at the wholesale level at $325 each with an 'established retail price' of $395.

If the tests conducted by Linkabit, on more than 20 home style TVRO receivers, did reveal that only four of those receivers would function properly with an 'outboard' or 'stand-alone' baseband descrambler, there would certainly be concern on the part of a proposed programmer (such as Showtime) that the 'size of their market' would be quite small. Understanding the ramifications of the Linkabit testing, which produced the decision that stand-alone units must contain both baseband video **AND** 70 MHz 'IF' input circuitry, is key here to understanding why M/A-Com ultimately decided that the stand-alone VC2000E must contain essentially redundant signal processing circuitry that virtually all receivers already contain.

In a letter dated March 12th, M/A-Com's **James F. Bunker** invited TVRO receiver OEMs to the La Jolla 'show and tell' scheduled for March 28 and 29. Attached to the letter was a sheet of paper which Bunker 'invited comments' about. This sheet of paper contained what M/A-Com indicated was an **'estimate of the installed satellite receiver base.'** He wanted the receiver OEMs to review the table contained on the page and 'comment.' We show that table here because it illustrates the estimates by M/A-Com of the number of TVRO receivers in place, **at the end of 1984,** from 32 different receiver manufacturers. This 'table' was obviously important to Bunker and M/A-Com because as Linkabit reviewed (using the 'bit error rate test') the performance of various receivers it had acquired for test purposes, it would then translate the test results to this table to determine their best estimate of how many TVRO receivers then in the field might actually work with proposed descramblers. As you study this Bunker-M/A-Com estimate, note two things:

A) M/A-Com is **estimating** what **other receiver manufacturers** have built from 1980 through 1984, and,

B) M/A-Com may (or may not) be revealing their own

SCRAMBLING/ continues on page 34

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- Patented CCD scrambling technology.
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- Developed non-volatile parental control in CATV converters.
- Developed addressable baseband scrambling system for pay TV.

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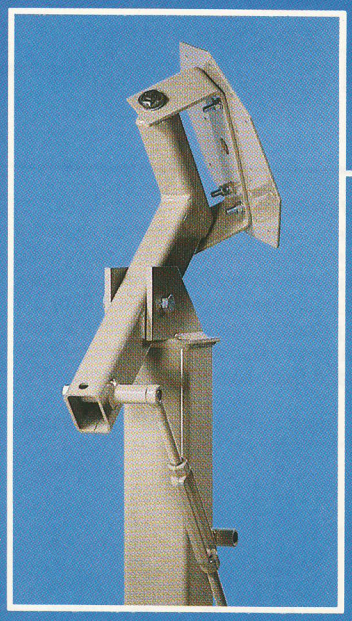

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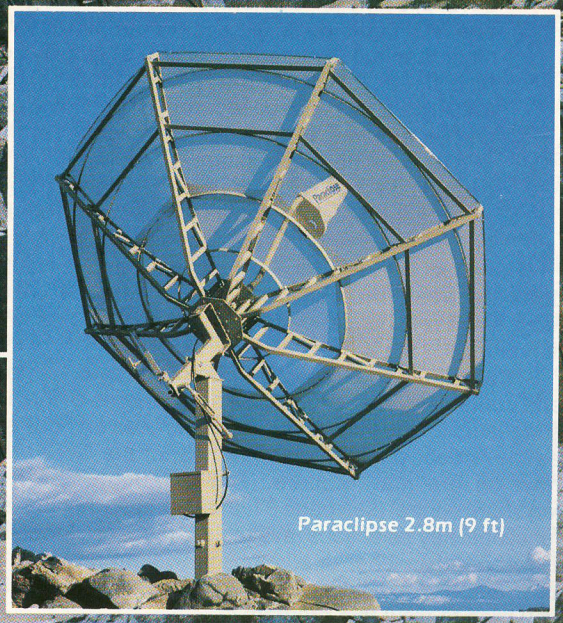

Paraclipse 2.8m (9 ft)

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SCRAMBLING/ continued from page 31

'shipping numbers' for the years 1982/1983/1984.

Regardless of the authenticity of the table, or the accuracy of the Linkabit testing of receivers, when Linkabit reported to M/A-Com management that only '4 out of 22' receivers tested performed with the baseband version of the descrambler, it is certainly understandable that a program supplier such as Showtime might seriously 'lobby' M/A-Com at this point to request that some more universal method be devised to allow the existing receiver universe to function with the proposed scrambling system. **The VC2000E stand-alone unit was that response.**

The VC2000E should be considered as the 'interfacing unit' between the (proposed) scrambling services AND all of the receivers now in operation, or built without the IRD capability in the future. In La Jolla, M/A-Com repeatedly voiced the opinion that it hoped that the VC2000E unit would be an 'interim' unit, suggesting that as **all** receiver suppliers saw the wisdom of allowing their receivers to interface with the IRD 2000M module unit, there would ultimately be a time when nobody would need the VC2000E anymore.

The VC2000E will accept either composite input (which could be used in those receiver situations where the receiver video was sufficiently pure to allow this connection) OR a 70 MHz input. The assumption was that virtually all receivers would provide a 70 MHz input to the VC2000E since there was the conviction that very few receivers would have sufficiently clean video to allow use of the baseband video drive source.

The VC2000E in the 70 MHz input mode has several interesting points:

1) Essentially, you take the 70 MHz output **from the downconverter** and feed it to the VC2000E rather than to your TVRO receiver 70 MHz input. A 70 MHz 'loop through' then carries the 70 MHz IF signal back to the receiver **(see diagram)**.
2) The existing receiver then becomes a **(a)** power supply for the downconverter and LNA, **(b)** a tuning voltage source for the downconverter local oscillator, and **(c)** a polarization control system for the existing receiver/ antenna interface. If the receiver also controls the dish drive, this function also stays with the existing receiver.
3) The VC2000E does all of the normal 'receiver jobs' other than those stated, including **(a)** amplifying the 70 MHz signal, **(b)** filtering the 70 MHz signal, **(c)** detecting the 70 MHz signal to baseband, **(d)** providing clamping and de-emphasis to the detected signal, **(e)** providing audio detection and filtering, **(f)** providing RF re-modulation (to VHF channel 3 or 4) and **(g)** providing switchable selection between the local (off-air) VHF input signals and the satellite service signals.

The effect is the same as simply saying "We would rather do it ourselves." The cost to the user, as noted, would be $395 (suggested retail price) per consumer user; plus any installation charge.

The VC2000E is really two boxes in one, as noted. It is and contains all of the functions and features of the 'IRD' unit suggested for the integration into new receiver models, as well as the 'indoor portion' found in most of the TVRO receivers now on the marketplace. The VC2000E has a built-in keyboard control (see page 31, this issue) so that there are '24 functional key selections' available. This is required since the Linkabit Videocipher descrambling system requires that the user 'respond' to on-screen 'prompts' or questions such as 'Do you wish to view this program?'.

M/A ESTIMATE OF TVRO UNIVERSE

M/A-Com Senior Vice President **James F. Bunker** circulated a questionnaire to leading TVRO receiver manufacturers requesting their comments on a M/A-Com 'estimate' of the TVRO 'receiver base' at the end of 1984. Numbers are in thousands (i.e. **8** = 's **8,000**) per year. Those interested in helping Bunker 'refine' this estimate may send their corrected copies to James F. Bunker, Senior Vice President, M/A-Com, Inc., 7 New England Executive Park, Burlington, Ma. 01803.

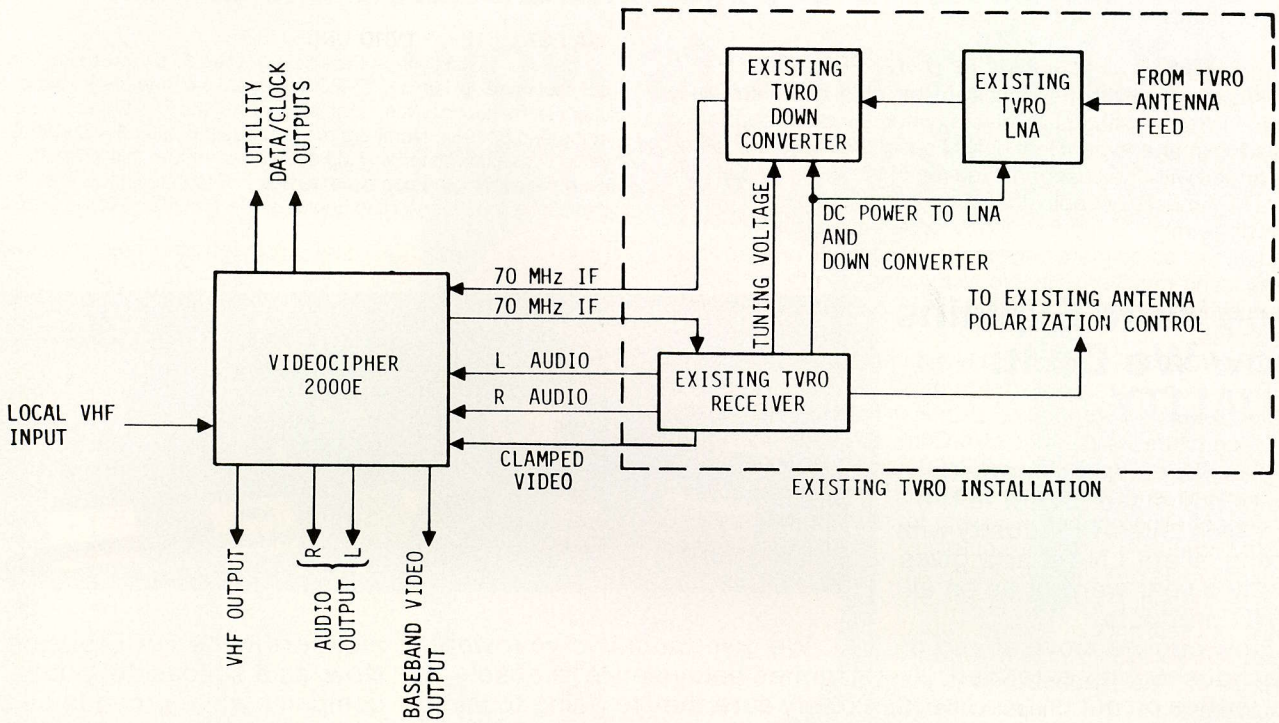
OEM	1980	1981	1982	1983	1984	Total	Percentage
Amplica	0	0	4	8	12	24	3%
Anderson	0	0	0	3	3	6	1%
Auto-Tech	0	0	8	24	18	50	6%
AVCOM	1	2	3	1	0	7	1%
Bearcat	0	0	0	0	1	1	0%
Birdview	0	0	0	12	20	32	4%
Boman	0	0	2	4	8	14	2%
Channel Master	0	0	*	*	20	20	2%
Conifer	0	0	*	*	*	0	0%
Cook	0	0	0	0	2	2	0%
Earth Terminals	0	0	1	2	1	4	0%
Electrohome	0	0	1	4	3	8	1%
Fanon	0	0	0	0	1	1	0%
GENSAT	0	0	0	0	5	5	1%
Gould-Dexcel	0	1	4	10	15	30	3%
HERO (**)	1	2	3	4	3	13	1%
Intersat	0	0	1	3	5	9	1%
Janeil	0	0	0	12	30	42	5%
KLM	1	9	20	35	30	95	11%
Lowrance	0	0	0	2	5	7	1%
Luxor	0	0	0	25	18	43	5%
M/A-Com	**0**	**0**	**4**	**6**	**15**	**25**	**3%**
R.L. Drake	0	3	18	35	110	166	19%
Regency	0	0	0	2	5	7	1%
Sat-Tec	2	6	20	30	22	80	9%
STS	1	2	0	5	20	28	3%
Toki (Astron)	0	0	0	20	40	60	7%
Uniden	0	0	0	0	75	75	9%
USS Maspro	0	0	1	10	2	13	1%
VISTA	0	0	0	0	1	1	0%
Wilson	0	0	0	2	5	7	1%
Winegard	0	0	0	1	5	6	1%
TOTALS	6,000	25,000	90,000	262,000	498,000	881,000	100%

*/ Indicates receivers actually built under contract by another OEM.

/ Hero (Communications) has **never been in the TVRO receiver business other than limited packaging of AVCOM units, with their own front panel, for sales overseas; **editor.**

During the La Jolla meeting M/A-Com 'shared' the following information relative to the VC2000E unit:

1) No testing of TI laced signals had been done although **Dr. Woo Paik,** Director of Engineering for Linkabit did express the belief that 'certain levels of TI could be tolerated';
2) The original specifications, released to the TVRO industry last fall, were in more traditional terms (luminance to chrominance delay for example) although in reality what **really counted,** to Linkabit, was the 'measured bit error rate' (10^{-3} at 9 dB carrier to noise ratio);
3) The VC2000E units audio outputs are left and right channel, only. The only monaural output available when a stereo (scrambled) program is being received is at the RF output (i.e. no hi-fi system hookups possible with baseband monaural audio, when using scrambled programs);
4) The AFC range for tracking 70 MHz input signals is ±5



VC2000E installation configuration when the descrambler is fed by the downconverter's 70 MHz output; drawing courtesy of M/A-Com.

MHz;

5) The VC2000E unit was, **in March,** scheduled for distribution in the following format:
   - **A)** Through M/A-Com distributors,
   - **B)** Through OEMs for 'system packages,'
   - **C)** Through scrambled programmers for distribution through their affiliates (i.e. through HBO to the local cable company for local distribution as the cable company determined),
   - **D)** Direct to consumers through a direct marketing (i.e. Telemarketing) campaign.

The direct to consumer approach had lowest priority and highest chance of failure, it was noted, and some 'market testing' would be done to measure the 'problem rate' encountered by consumers who obtained their descrambler directly from a telemarketing firm for self-installation.

- **E)** There is one potential problem, **even with the 70 MHz input units** fed directly by the (existing) 70 MHz output downconverter. If the downconverter contains bandpass filtering at 70 MHz (many do), there is a potential problem with accepting the 70 MHz signal by the VC2000E **after** the signal has been 'conditioned' by the downconverter's 70 MHz IF filtering. In effect, the VC2000E would prefer to see a 70 MHz IF signal which had NOT BEEN filtered at 70 MHz in the downconverter.
- **F)** In a home unit installed, **'diagnostic information'** can be 'called up' on the screen when a consumer experiencing difficulties is on the telephone with a consumer service rep. By following instructions received on the telephone and 'punching up' certain key sequences on the keyboard, a set of diagnostic numbers will appear on the screen. The customer tells the customer service rep the numbers seen and those numbers in turn assist the service rep in determining where the problem is and what needs to be done to fix it. (This is also true with the VC2000**M**, of course.)

NON 70 MHz IFs

The selection of a 70 MHz IF 'input' for the VC2000E certainly makes good sense when you recognize that a high percentage of the TVRO receivers in place also use 70 MHz as a common 'IF.' **However,** a significant number of the **newer receivers** now in the marketplace **do not make use** of 70 MHz, or if they do, it is buried within the receiver after a blockconversion higher IF such as 430-930 MHz or 950-1450 MHz.

And while it is true that many of the block receivers using higher IFs also reconvert to 70 MHz **within the receiver package** for signal processing, access to the 70 MHz signal is not always apparent. Some receivers bring the 70 MHz signal, from within the receiver, 'outside' as a means of installing 70 MHz IF band terrestrial filters and in this situation the receiver would at least have the proper **frequency band** available to deal with the 70 MHz input requirement of the VC2000E. **However,** remember that M/A-Com is requesting that any 70 MHz inputs brought to the VC2000E be **free of any bandpass filtering at 70 MHz** and virtually all of the receivers which have access to the 70 MHz signal have done some 'IF filtering' prior to the 70 MHz 'loop-out-through' back apron connections.

So receivers that do not have a 70 MHz IF, or which make the 70 MHz signal available only with some difficulty or after 70 MHz bandpass filtering, are a 'special problem' for descrambling with the VC2000E. In this situation, a dealer may be faced with utilizing receiver baseband video outputs **only,** and hoping that the baseband video is pure enough not only to properly descramble (see **CSD/2** for **April 15th**) but also pure

SCRAMBLING/ continues on page 38

California Amplifier's TVRO Products Now Have 2-Year Warranties!

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Yes. The first company to break the noise barrier in the Home Satellite TV industry with strong, silent LNA's, now gives you two-year warranties on all TVRO products.*

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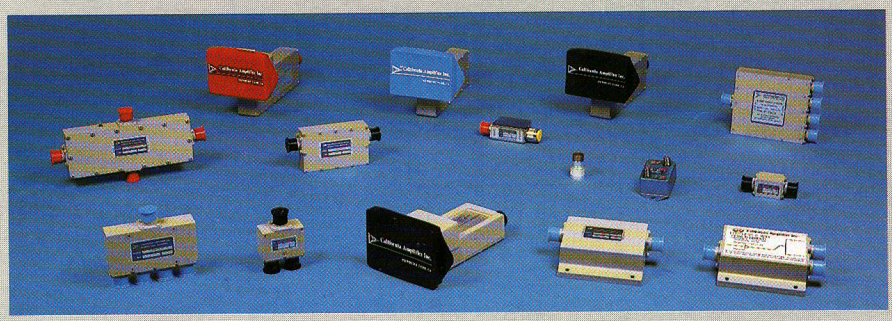
California Amplifier products incorporate computer-controlled automated assembly. Every LNA is burned in and electronically tested five different times



in the production cycle. Assembly processes are inspected under a microscope to meet rigid quality standards.

Our products are subjected to a series of grueling random-sample tests. Water immersion. Shock. Temperature cycling. Everything in the book! The result? Long-term reliability is built in.

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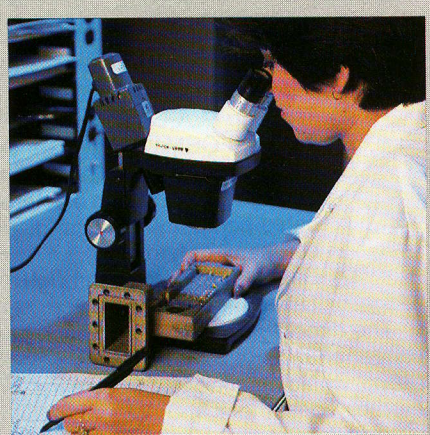
Our people started out as pioneers in the TVRO business. Now, as a successful public company, we're proud to be the leader in new product innovation and service.



California Amplifier Inc.

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SCRAMBLING/ continued from page 35

enough for the temperamental 'serial digital data addressing' function which is a part of the system.

SUBsequent

While the La Jolla meeting was taking place, the participation of Home Box Office in the marketing aspect of the program was still 'in place.' However, subsequent to the La Jolla meeting HBO changed their mind and decided they would not become the 'bundler' of scrambled programming for home TVRO. M/A-Com then picked up the baton and during the last two weeks in April M/A-Com was 'on the street' talking with both premium and non-premium programmers about the possibility that it (M/A-Com) would lead the effort to package multiple premium program services for home consumption. **(See Coop's Comments, this issue.).**

It is important to recognize that built-into the VC2000E (and the VC2000M) is the ability for two or more scrambled program services to share the 'data stream' for individualized control and approval of either single (scrambled) services or some combination ('tiers') of scrambled service. Individual home subscribers can be addressed and their descrambler boxes can be told which scrambled channels to 'unlock,' either on a full-time or a 'per event' basis.

Based upon M/A-Com announcements in early May, the descrambler boxes (i.e. the VC2000E units) **will be made available** through cable affiliates, through established M/A-Com distribution channels (i.e. a distributor such as **Satellite Video Services),** and, through a direct (telemarketing) campaign. It **appears** that HBO itself will operate the telemarketing program using an 800 number call-in approach with $395 established as the selling price for the VC2000E. In this latter case, the home user would be responsible for his own installation or perhaps he would ask the assistance of his local dealer in making sure the unit was properly installed.

In either event, the dealer will become involved at least to the extent that he will have to know and understand the options available to his customers and be able to explain to the customer that **should they wish to subscribe** to the 'premium' HBO and Cinemax services, that a descrambler unit will be available to them through one or several sources.

BOTTOM Line

Regardless of what other premium (and non-premium) programmers do, the scrambling scenario **will be** pushed ahead by HBO. If HBO is the **only** premium programmer electing to scramble during the balance of 1985, it is unlkely that a significant number of homes will opt for the special service at the $12.95 for one, $19.95 for both rates quoted by HBO. As Showtime/The Movie Channel and other services roll out their own scrambling program, however, marketplace interest in descramblers will pick-up. M/A-Com is first into the marketplace with hardware and HBO, separate from M/A-Com, is first into the marketplace with a marketing program that offers descrambled service to home users.

VC2000E INTERFACE SPECIFICATIONS

70 MHz IF Output From LNC/
- **Signal Type:** 70 MHz frequency modulated (FM) signal with nominal bandwidth of **30 MHz**
- **Signal Level:** −55 dBm to 0 dBm
- **Center Frequency:** 70 MHz, ±5 MHz
- **Output Impedance:** 75 ohms
- **Carrier to Noise:** 9 dB minimum with 30 MHz noise bandwidth **(*)**
  */ Equivalent to approximately 10 dB CNR with 22 MHz bandwidth

Composite Video Output From Receiver/
- **Signal Type:** Unclamped, unfiltered, deemphasized NTSC composite baseband output and, if present, energy dispersal (i.e. unclamped) and audio subcarriers
- **Deemphasis:** CCIR recommended 405-1
- **Video Polarity:** Negative sunc
- **Signal Level:** 0.5 volt peak to peak to 1.5 volt peak to peak
- **Output Impedance:** 75 ohms, AC coupled (minimum of 1500 MFD coupling capacitor*) or DC coupled (maximum DC offset of ±3 volts)
  */ VC2000E has an **internal** clamping circuit and this unusually large value of coupling capacitor is to insure that the clamper operates at sufficient 'speed.'
- **Output Return Loss:** 15 dB minimum
- **Frequency Response:** ±0.5 dB from 30 hertz to 3.58 MHz, ±1.0 dB from 3.58 MHz to 4.2 MHz
- **Chrominance-Luminance Delay Inequality:** ±25 nanoseconds
- **Differential Gain:** 7% peak to peak maximum (10-90% APL)
- **Differential Phase:** 5° peak to peak maximum (10-90% APL)
- **Line Time Distortion:** 5 IRE units peak to peak maximum
- **Field Time Distortion:** 5 IRE units peak to peak maximum
- **Signal to Noise** (weighted): **47 dB** minimum with deemphasis
- **Connector:** RCA phono or type F female (RCA phono recommended)

Clamped Video Output From Receiver/
(This input is used for the demodulation of **non-scrambled** signals since remodulation of all signals [scrambled or not scrambled] takes place in the VC2000E.)
- **Signal Type:** Clamped, lowpass filtered, deemphasized NTSC baseband video
- **Signal Level:** 0.5 volt peak to peak to 1.5 volt peak to peak
- **Output Impedance:** 75 ohms, AC coupled

Audio Output From Receiver
- **Signal Type:** Baseband audio
- **Signal Level:** 300mV to 5V peak to peak
- **Output Impedance:** 1,000 ohms maximum
- **Connector:** RCA phono jack
- **Number of Outputs:** One (monaural) or two (stereo left and right)

Suggested Pricing/
- **Wholesale:** $325 to OEMs, distributors 'in quantity'
- **Retail:** $395 to end-user customers

Availability/
- **To Distributors:** Target date 'late summer'
- **To Consumers:** Target date 'early fall'

AUDIO Specmanship

As we saw in our April issue, the games played by receiver OEMs in the areas relating to video 'specmanship' are really quite easy to understand. The video, on the screen, is a form of 'self-proof' since most people can detect the difference between a good picture (i.e. pleasing) and one that is not so good. The audio, however, is far more subjective to evaluate with the ear since the audio parameters change so rapidly.

There are two diverse elements at work here; the quality of the audio transmitted, and totally separately, the quality of the audio received. The receiver can produce high quality audio only if the uplink transmits high quality audio. However, there is no real way to determine the quality of the uplink audio unless you simply 'compare' various downlink audio receiving systems.

Additionally, many people have limited hearing abilities. Those who have vision impairment usually will accept correc-

tive lens as a solution. Those who have audio impairments may not even be aware of the affliction and then once aware of it, reluctant to do something about it unless they are approaching deafness. Just as there are grades of vision loss (corrected with different values of corrective lens), there are also **levels of** hearing loss. Unfortunately, the 'ear industry' is not nearly as 'state of the art' as the 'eye industry' and people usually resort to hearing assistance equipment only in desparation.

All of this may seem pretty obvious but it bears repeating since the measurement of sound is not nearly as carefully defined a 'science' as the measurement of vision or eyesight.

And, people know when they cannot see something because there is information missing; they are far less apt to recognize that they cannot hear something since so many 'sounds' are spread over a wide (audio) frequency range and even absent **some portions of that spectrum** in their own hearing apparatus, there are plenty of other sounds to keep them going under the illusion that their hearing is 'normal'. And all of this makes the creation of a 'perfect sound system', or even an 'acceptable sound system' more difficult on the practioner.

Lastly, most people will relate sounds from an electronic instrument, such as a television set, to the sounds they have grown accustomed to hearing from such an instrument. If you **never hear flutes** from your television set speaker, you don't miss them; there are simply no flutes on television! If the 'roar' of an ocean beach is depicted as the 'hiss' of an ocean beach through your television speaker, that is because 'oceans hiss', not because 'oceans don't roar'. In other words, **one becomes conditioned to the sound one hears** without any thought given to the way the event depicted **actually sounded** when it was recorded or transmitted.

All of this makes the audio portion of satellite television more difficult to properly analyze. Let's see what we have to work with.

1) A standard AM audio signal, such as from your local radio station, is capable of portraying the audio spectrum from approximately **50** hertz to approximately **9,000** hertz.
2) Your local television station is capable of transmitting audio between approximately **50** hertz and **12,000** hertz.
3) Your local FM radio station is capable of transmitting audio between approximately **30** hertz and **15,000** hertz.

And on satellite, we have the capability of:

4) A standard audio subcarrier, carrying the program audio for the video, can handle between **40/50** hertz and **12,000** hertz **(*)** and
5) A subcarrier not associated with the video is capable of handling audio bandwidths that vary between **40-50** hertz on the low end and **5,000** to **12,000** hertz on the high end.

If you have 'excellent' hearing, your ears can detect sounds between 30-50 hertz on the low end and 15,000 to 20,000 hertz on the high end. Therefore, with the possible exception of an FM radio broadcast, your full hearing capacity is never really 'taxed' by the sounds sent to you from an

*/ Most television program transmission operators recognize the limitations in modern television sets and see no reason to transmit a greater audio bandwidth (i.e. increased audio fidelity) if the majority of the receivers are themselves incapable of 'hearing' the difference.

RECEIVER SPECS: AUDIO TRICKS/ (Part Three)

electronic system. Most people do **not have** excellent hearing so in practice the sounds you hear are typically between 40-60 hertz and 12,000-14,000 hertz. You can do a quick test of your own hearing upper limit capacity by placing your ear directly on the case of an older television in a quiet environment listening. Do you hear a very shrill (high pitched) tone? There is a **15,750 hertz** oscilator inside of the TV set which can be heard by those who have especially wideband hearing. Most people cannot hear it (which is one of the reasons the oscillator is 'acceptable' at all!).

Unfortunately, how well you can hear or how much you hear, even assuming all of the normal audio range (30 hertz to 20,000 hertz) is present at the transmitter uplink, is something you never have the opportunity to measure. Why? Because even if the transmitter is 'perfect' and your satellite receiver is 'perfect', and your ears are also 'perfect', the sound system you are listening on will not be. There is no such thing as a 'perfect **consumer** audio system'. For any price. So even in the best of circumstances, you will not enjoy 'perfect audio'.

So if nobody has ever heard 'perfect audio', how do we know there is such a thing? That is the kind of question which starts audio engineers down the road to 'compromises' taking shortcuts in equipment design since they know that their own shortcuts will be 'masked' or 'hidden' by other shortcuts (or systems failings) anyhow.

We'll come back to the ultimate 'sound of audio' later on. For now, let's deal with the audio parameters which the receiver suppliers do publish for us.

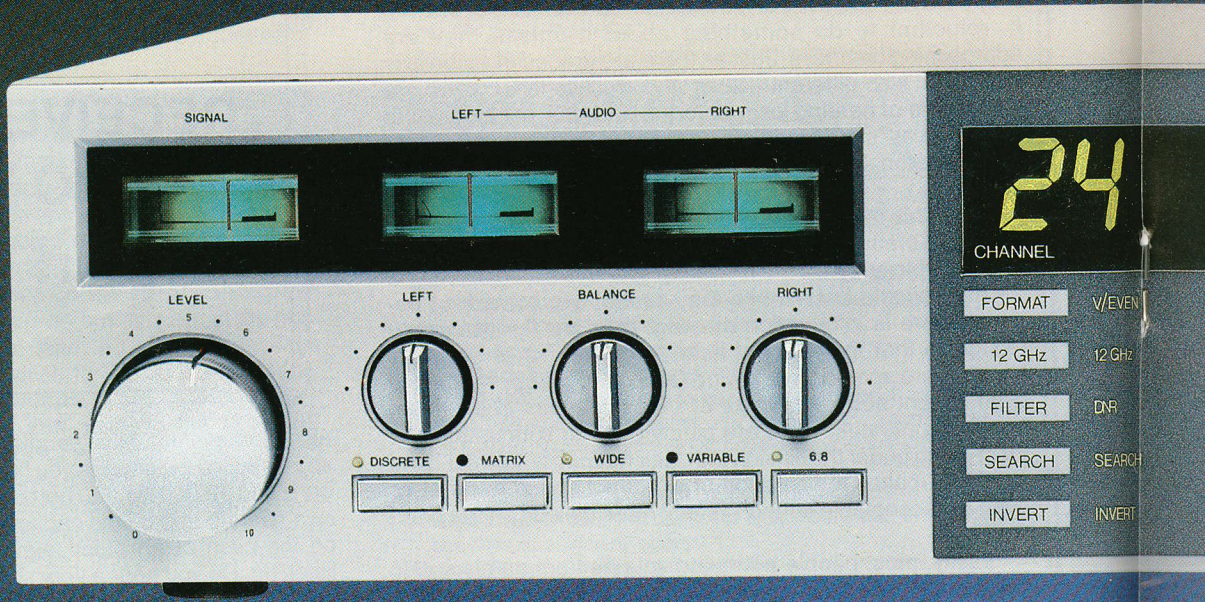
AUDIO Bandwidth

Last month we studied the effects of video bandwidth on video 'fidelity'; or the art of reducing the receiver's IF bandwidth to the point where objectionable noise was eliminated in favor of improved video quality. And we learned that while the bandwidth of the transmitted uplink signal may be as much as 32 megahertz, that within that 32 megahertz 'band' we would find 90% or so of the actual information within the center 25 megahertz or so. And we thus learned why it is permissible, even desireable, to narrow the bandwidth of the receiver to the point where the information 'along the edges' of the bandwidth was eliminated from the receiver's signal processing circuits.

We have the same type of situation present with the audio signal; it has a finite, measurable width but most of the 'energy' or information on the signal is in that center portion. So it follows, within limitations, that it is possible and even desirable to operate the receiver bandwidth at something **less than** the (uplink) transmitter bandwidth for the same audio signal. We

AUDIO SPECS/ continues on page 42

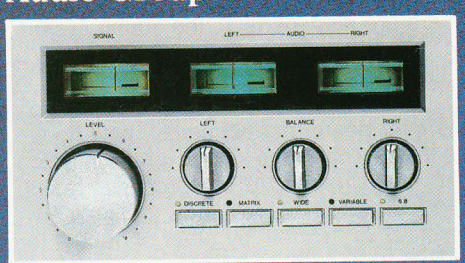
At Last...



INTRODUCING . . .
The all new - - All in One Super Satellite Stereo Receiver from Boman Industries.

Convenience and style combined with the latest in TVRO technology makes the Boman Model SR2500 the receiver to which others will be compared.

Audio Group



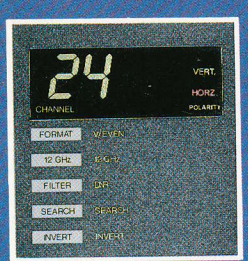
Separate meters showing Signal Strength and Left - Right audio levels are provided with soft green illumination. Left-Right audio channel tuning is adjusted by separate controls. A balance control is provided for attaining that perfect *stereo* effect.

The pushbutton group consists of the "Discrete" and "Matrix" *stereo* buttons. Bandwidth is expanded by use of the "Wide" button. These three controls enhance the reception of all available audio transmissions.

The audio pushbuttons offer a choice of preset 6.8 tuning frequency for most video channels and variable audio for *stereo* or subcarrier reception.

The Detent Volume control adjusts the volume and adds to the attractive design of the *stereo* section.

Function Group



The attractive display panel shows channel number and polarity position in a soft green color.

The Format button transposes the polarity mode when receiving signals from the few satellites with reversed polarity signals.

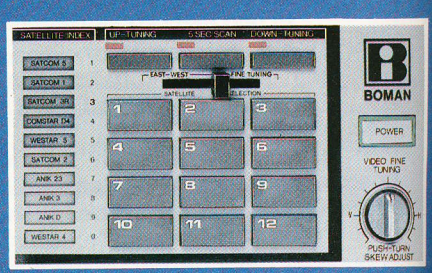
The 12 GHz button changes the operation of the SR-2500 from 4 to 12 GHz when used with appropriate 12 GHz hardware.

DNR function provides a filtering of background noise from the audio thus providing very high quality audio performance especially on weaker signals.

A Search button gives a fast scan of all channels and is of assistance during the initial alignment and orientation of the programmable moving control.

The Invert button is provided for reception of inverted video signals.

Satellite Selection Group

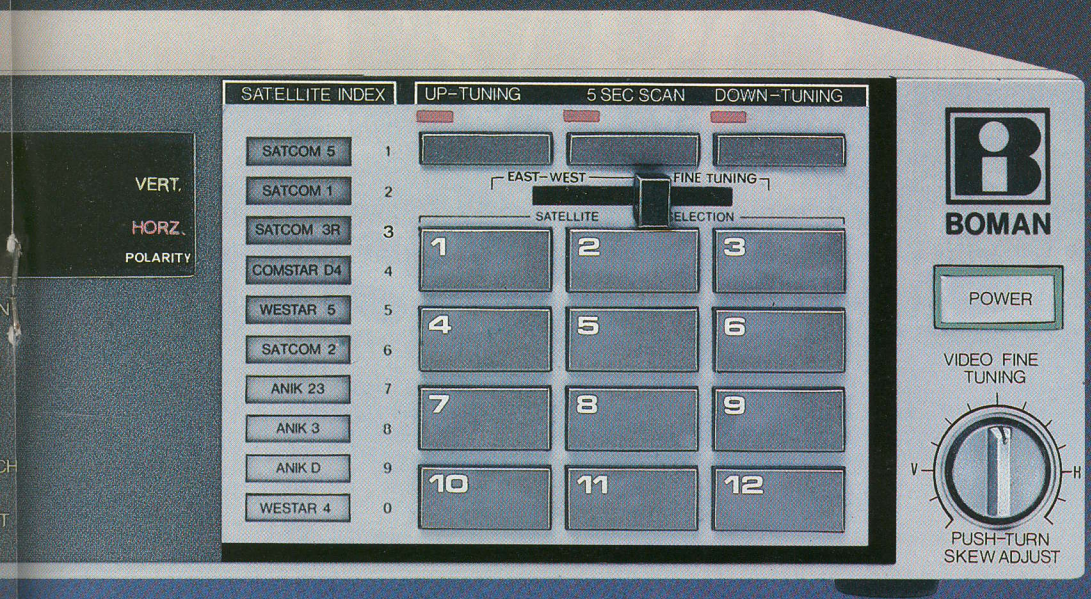


Satellite selection is accomplished with the 12 pushbutton pad.

All In One.

$389.50

Down Converter And Automatic Actuator Control Included



The interfaced control then automatically moves the antenna to the pre-programed position.

A removable Satellite Index is provided which indicates the selected satellite. Up to 12 different choices of satellites may be illuminated individually. Additional satellite decals are furnished to provide a maximum of 24 satellite variations.

The East/West fine tuning control is used for that extra special antenna peaking which is sometimes required.

The "UP" and "DOWN" tuning buttons provide manual selection or scan of channels in 1 step or 2 step and continuous operation. The 5 second Scan button allows the user to view each channel for 5 seconds during the 24 channel scan.

Video Fine Tuning and Skew adjustment is made quick and easy using the dual function fine tuning control.

Other features found either inside or on the rear panel of the SR-2500 are:

- Automatic Polarity Switching.
- Command Tone Response: *A "Beep" audio tone is heard when any of the Feather-Touch push-buttons is used.*
- LNA/Down Converter power remains on when the unit power is switched off: *No more LNA/DC warm-up drift.*
- Integrated Channel 3 - 4 Modulator.
- 1 -2 Step Channel Advance Switch.
- Separate Sub-carrier Outlet.
- IF Gain Control.
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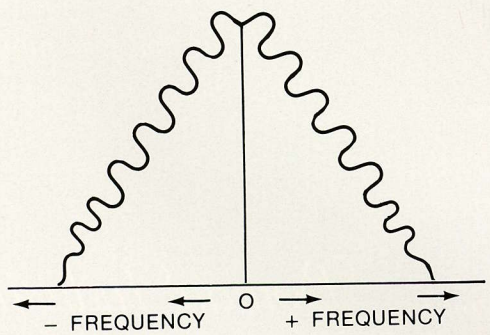
AUDIO SPECS/ continued from page 39

do this for the same reason as with video; by ignoring those lower level signal components which appear along the edges of the bandwidth, we also eliminate any of the noise which is present in the same frequency 'region' as the lower edges of the audio 'skirt'.

An engineer playing this 'how-narrow-can-I-go' game with video watches his picture as he makes the bandwidth more narrow and more narrow. At some point he begins to detect (with his eye) a washing out of the video detail; he is approaching the point where the picture 'detail' and the picture 'contrast' (or luminance) is being withheld from the receiver demodulator. It is simply falling 'outside of' the bandwidth he has chosen. If he goes far enough with this 'narrower-is-better' exercise, he will also lose the color.

An engineer doing the same thing with audio will begin by losing first the 'extremities' in the system. The 'highs' will diminish first, followed next by the 'lows'. But, if he is listening to this test on a 3 or 5 inch speaker which is itself not capable of producing sounds below 70 hertz nor above 7,000 hertz, he will never miss what he is eliminating! What he **will notice,** as he narrows the audio bandwidth is that the audio signal to noise (the ratio between the desirable sound and the non-desirable noise) **is improving** as the bandwidth is narrowed. And that is the objective of the exercise.

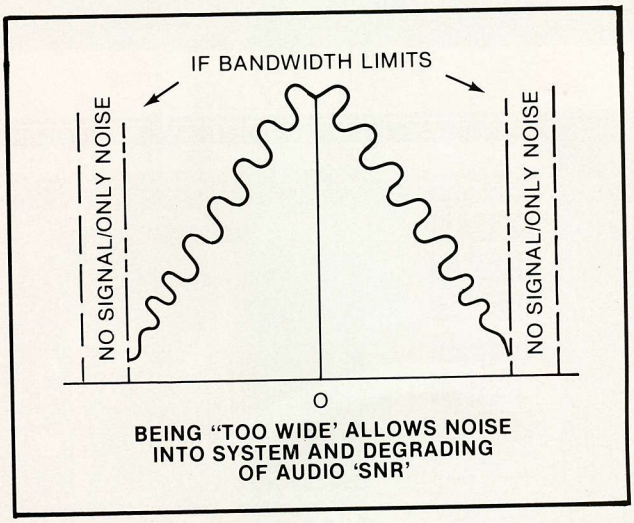


THE AUDIO SPECTRUM THROUGH THE RECEIVER 'IF'

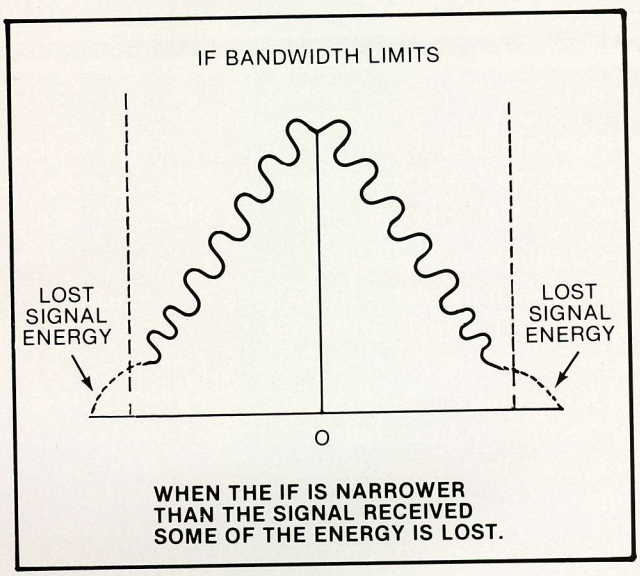
But there is an objectionable side effect to narrowing up the audio bandwidth too far, even if you cannot hear the 'loss' of the low and high ends of the audio spectrum; truncation.

Truncation is a fancy term that describes what happens when you try to cram too much electronic information into too little space. An IF filter, narrower than the signal, can be made **so narrow** that the signal bounces or reverberates from the sides of the filter. **We diagram that here for you.**

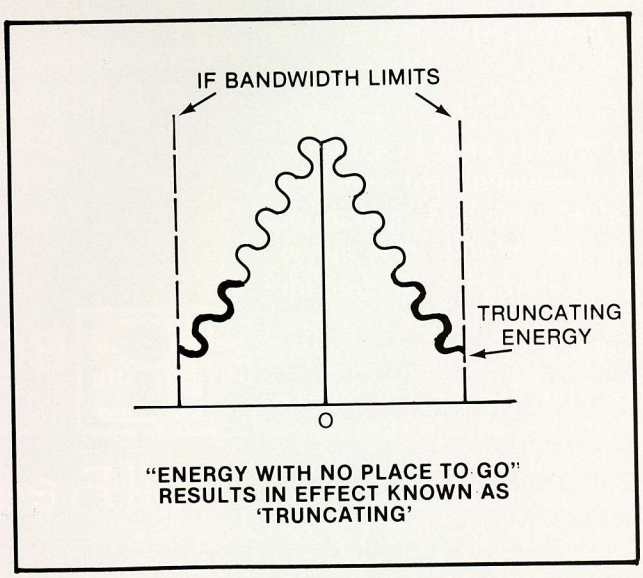
When this happens you can 'hear' the side effects; the sound becomes muddy and almost hollow sounding. Not a good situation. And you can duplicate this on your TVRO receiver by tuning in a really wide audio subcarrier (such as **Disney** or **Nashville Network**) and then switching to the **'narrow' position** on your TVRO audio. It may even sound like the sound is 'beating against the walls' inside of the receiver. And indeed that is what is happening; parts of the sound are being 'cut off' as the intelligence on the carrier finds no



BEING "TOO WIDE' ALLOWS NOISE INTO SYSTEM AND DEGRADING OF AUDIO 'SNR'



WHEN THE IF IS NARROWER THAN THE SIGNAL RECEIVED SOME OF THE ENERGY IS LOST.



"ENERGY WITH NO PLACE TO GO" RESULTS IN EFFECT KNOWN AS 'TRUNCATING'

AUDIO SPECS/ continues on page 46

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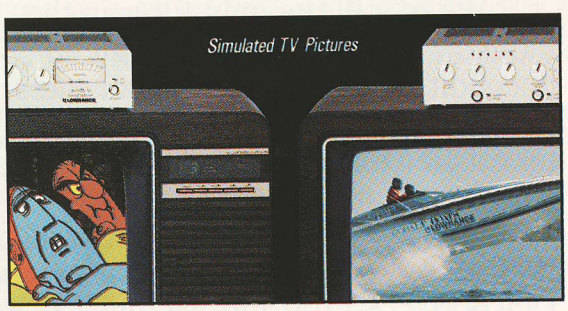

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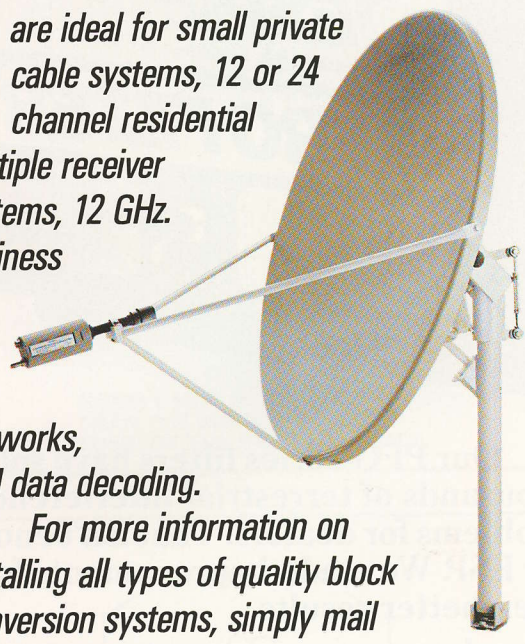

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AUDIO SPECS/ continued from page 42

place to go.

So audio bandwidth, unlike video, is typically a more 'subjective' evaluation; it depends first of all on the source (or original bandwidth) of the transmission, next on the method and equipment utilized by the individual doing the evaluation, and finally, on the hearing 'response' of the evaluator. It is far easier to fool a person's hearing sense than their visual sense.

If 'pure audio engineers' ran all of the uplink systems, we'd have **one** audio subcarrier per transponder and it would probably be 750 kHz wide or so. On the other hand, **if the accounting departments** ran the audio subcarrier systems, we'd have an entire 'stack' of 35 kHz wide subcarriers each one carrying a different 'revenue-bearing' customer. Given these two extremes, you can readily see why we end up with various in-between-position compromises. You can also see how difficult life gets for the receiver designer trying to cope with all of these variations!

RELATIONships

There is the general misconception that the bandwidth of the transmitted signal is somehow **directly related to** the frequency response or 'range' of the recovered audio. Within the ranges we are largely discussing here, this is incorrect. Unlike normal 'AM' (amplitude modulation) techniques where the amount of information transmitted is directly proportional to the amount of spectrum space (i.e. bandwidth) occupied, in a 'wideband' FM system, the two are only third-cousin related.

An FM transmitter deviates or varies in frequency (hence frequency modulation) as a function of the amplitude of the modulating signal(s). **Loud means the signal deviates more** (gets wider) and **soft means the signal is narrower** (deviates less). Now it also happens that some sounds are naturally louder than other sounds and most of the sounds we experience daily, even in music, are between 300 hertz and 7,000 hertz. That's why AM radio, with its limited amount of bandwidth, does a pretty fair job with most sounds we hear. But those extra deep sounds (base fiddles) and extra high sounds (flute or piccolo, which is 'pitched' a full octave higher than a flute) are also 'a part of life' and they have a place in the full world of sound. If, however, in the recording or transmission system the system itself fails to respond to their very low or very high pitches, then the **'volume levels'** of these instruments comes through 'muted' in relation to other instruments present. So life is stacked against musical instruments and sounds in nature **at either end of** the normal audio spectrum; if they are not 'heard' and 'processed' by the initial pick-up or recording devices, **at their 'full volume',** they are 'lost' in the transmission system. And recovery of these sounds in the 'playback system' (satellite receiver and its connected audio system) is made even more difficult. When is the last time you heard a piccolo through your TV set that sounded like a real piccolo? Yes, going through life as a piccolo is a little bit like being one of Ted Turner's kids; seen but never heard.

PRACTICAL Considerations

There is a wide variety of individual audio 'formats' in use on satellite; the result of no formal FCC mandated technical specifications. The uplink operator is virtually free to 'experiment' with any audio format he happens to like and this has resulted in more formats than you can count. Plugged into this confusion is the poor TVRO receiver designer who has to select user-friendly controls which don't require an electrical engineering degree to operate. Most of the industry has followed the lead of AVCOM and others who initially adopted a 'wide' and 'narrow' format for audio controls.

However, just as no two uplink system designers follow the same rules, so too do no two downlink receiver designers follow the same rules. What is wide to one designer may not be wide enough to another. Generally speaking, the audio IF bandwidths fall into the following classifications:

A) Wide/ anything **greater than 250** kilohertz

B) Narrow/ anything **below 250** kilohertz

So you end up with specifications such as '**(a)** Narrow 180 kHz, **(b)** Wide 280 kHz'. But how does that fit reality? From available information, it would appear that we have some subcarriers deviating (occupying) as little as 35 kHz and at the other end of the spectrum some as wide as 750 kHz **(**).** You can imagine what a carrier that is deviating 750 kHz is going to sound like when 'recovered' in a 180 kHz (or even 280 kHz) bandwidth; muddy. What are the arguments in favor of narrow and wide audio bandwidths as adopted by the uplink operator?

1) In favor of narrow:

- **A)** The narrower the audio bandwidth, the less 'transponder power' it uses and therefore the greater the amount the power available for the video portion;
- **B)** The narrower the audio bandwidth, the greater the total number of subcarriers that can be collectively transmitted on the same transponder (narrow uses less power per subcarrier, **and also** requires less subcarrier 'room' **and** there is a finite amount of 'room' available).

2) In favor of wide:

- **A)** The wider the bandwidth, the greater the 'potential' for full audio spectrum transmission (i.e. high fidelity);
- **B)** The wider the bandwidth, the greater the **potential** for improved carrier to noise/signal to noise ratios **provided** the receivers working with the system are also of the same bandwidth characteristics.

SIGNAL To Noise

The most important part of any audio system is to **match** the characteristics of the receiver to the characteristics of the uplinked signal. **That includes the bandwidth of course.** Dedicated communication systems get around this by standardizing on specific transmission bandwidths and then building all of the receivers to fit the same bandwidth. If 15 kHz goes in, 15 kHz comes out and the two are 'matched'.

When you have selected a receiver audio bandwidth which is greater than the transmitted audio bandwidth, the receiver is looking at 'spectrum' which has no signal in it. Even on high volume (maximum deviation) peaks. So the noise, which is always present when there is no signal available, fills in 'around' the signal. This simply means that you have a mixture of signal (information) and noise arriving at the receiver's detector stage. The FM detector should, **in theory,** ignore much of the noise present but unfortunately it cannot ignore all of the noise so you have a relationship developing between the desired signal(s) and the non-desired noise. We call this relationship the **'signal-to-noise ratio'.** In our signal to noise equation, we would like to have as much signal (the first number) as possible and as little noise as possible (the second number). As a practical matter, most audio signal to noise practitioners felt that any signal to noise beyond 55-60 dB was overkill. That was before digital audio came on the scene a few

---

****/** Ths AFRTS feed on transponder 24 of Intelsat 1 west holds the present record for wide audio bandwidth, measured at .75 MHz (750 kHz).

years ago. Most network and broadcast services like to see audio signal to noise ratios in the region of 57 dB although higher numbers are practical. This simply means that if there is any noise present (there is always some), that noise will be 57 dB weaker than the peak signal levels present. **How much is 57 dB?** Well, you can probably find out by tuning in the strongest, best quality satellite signal you receive and then adjust the volume to an ear-shattering level. Now, in that brief period when no audio is being transmitted, you will hear something approximating 'silence'. **Only it is not pure silence;** there is some amount of noise present. If you have good, strong satellite signals in your area, that 'silence' is about 55-60 dB weaker than the ear splitting sound that you just heard before the pause in audio transmission. 57 dB, then, is quite a bit.

SIGNAL To Hum

'Hummmm' is a special type of sound. In most cases, the 'hum' referenced is the sound of 60 cycles (or 50 cycles in 50 cycle areas of the world). Hum, then, is something caused by the **'power line frequency'.**

All power lines are alternating current; that means they have an operating frequency all their own. The AC wiring in your office or home is a giant antenna 'transmitting' this 60 hertz wave through the air. Fortunately you cannot hear it but the electronic equipment you operate from the AC power mains can 'hear' it. Internally, within your TVRO receiver and within the audio recovery section, the various transistors and IC devices operate not directly from the AC power lines but rather from **receiver created DC voltages.** In the process of converting the AC power into DC operating voltage, the alternating part of the voltage is transferred into something called direct current (hence DC). In this process, the power supply has to dis-rupt the alternating cycle to create a non-alternating voltage. There is a residual amount of 'alternation' carried through the power supply and into the internal (DC operated) circuits of the receiver. **This residual 'AC' appears as 'hum' or a background buzzing noise.** If this hum is significantly strong, you will hear the (now amplified) 60 hertz 'signal' in the background behind any other sounds being recovered by the satellite receiver. So there is a specification which measures how much of the residual 'AC hum' ends up in the audio output lines of the receiver; **signal-to-hum.** Once again, numbers like 50 or 60 dB are adequate since for the most part the sounds you are listening to are quite constant sounding and there are few 'gaps' or breaks in the sound transmission to allow the 'presence of' hum to be annoying.

There are two primary ways for hum to creep into a TVRO audio system; internally, within the receiver **(a power supply malfunction),** or, externally to the TVRO receiver where the audio output lines travel physically close to AC wiring and the audio wires are 'induced' by the 60 hertz power line frequency. If you have a TVRO receiver in the shop which has an annoying hum in the audio **and,** faint, drifting, wide black and white bars in the video, you can be sure that the receiver's AC to DC power supply system is failing. (The receiver has a single power supply which operates both the video and audio sections; a failure in the power supply causing humming in the audio is likely to also cause the visual equivalent of humming . . alternating, wide black and white bars . . . in the video.)

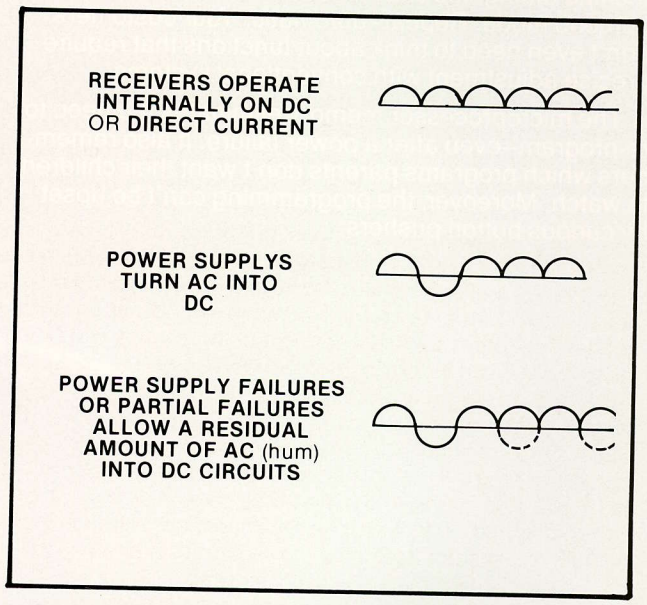
AUDIO Levels

Most TVRO receivers provide relatively low audio output levels; that is, they were not designed to power **(directly)** speakers. For most users, the audio is heard through the TV (re)modulated RF carrier output; it just 'appears' on the channel 3 (4, etc.) output of the receiver's internal modulator. The TV modulator requires very little audio power so there is no direct call for large amounts of audio in the TVRO receiver itself.

However, most receivers **also have** audio output jacks for the 'raw audio' so that it can be fed to external tape decks, to a sound system in the home or to an external modulator. These audio output levels may be fixed in level (i.e. there is no user volume control and you control the volume with or at the piece of equipment the audio connects to) or they may indeed have a volume control. In any event, the levels are seldom more than 0.2 watt so short of listening on earphones, you won't get much direct enjoyment from these output jacks.

Of greater importance than the level (which is quite easily resolved with an amplifier external to the TVRO receiver) **is the audio impedance.** What's that?

Every baseband circuit (video and audio) is designed to be connected to some type of follow-on circuit. This follow-on circuit is in turn designed to be connected to something ahead of it (our TVRO receiver). There is something called 'impedance' which defines the parameters of the two circuits plugging together, through an interconnecting cable.



In the audio world we have two 'impedance ranges' which are **commonly** in use:

A) 4 or 8 ohms, and

B) 600 ohms.

Your speakers (all of your speakers) are in the 4 to 8 ohm family. This is called 'low impedance' and speakers designed to have a 4 or 8 ohm impedance must be connected to (audio) amplifiers which are in turn designed to 'work into' a 4/8 ohm 'load'.

A 600 ohm circuit is seldom found in consumer products but it is common to commercial circuits. This 'higher impedance' approach to audio systems was created to provide better use of longer connecting cables between the 'source' and the 'load'. **Speakers are not 600 ohms** and therefore we have to observe that if 600 ohms is not utilized for the 'listening end' of sound systems, it must somehow relate to the 'transmitting end'. It does.

Many microphones you see are 600 ohms (or something close although this is no longer universal). Most modulators in

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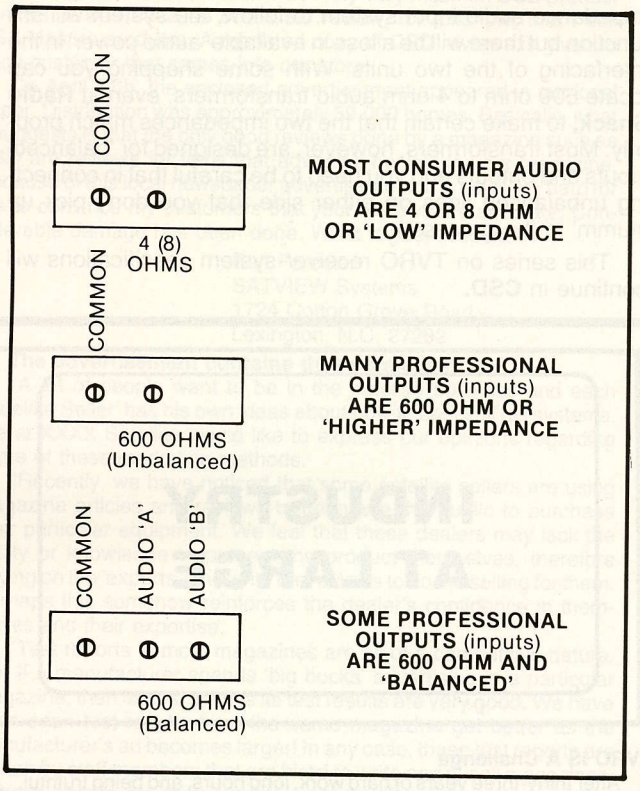
the commercial world have '600 ohm audio inputs' and most TVRO receivers in the **commercial world** also have '600 ohm audio outputs'. There are a few of these in the home TVRO world as well. The effect of all of this is that if you have a 600 ohm audio output impedance at your TVRO receiver and a low impedance (4 or 8 ohm) input impedance on your audio sound system (or vice-versa), you have something called (impedance) mismatch between the two. A mismatch between two different circuits results in power loss; a 600 ohm audio source (the receiver with the 600 ohm output) cannot properly transfer audio power to a 4 ohm input on an audio (pre)amplifier. A significant amount of the original audio power available on the 600 ohm line is 'lost' in the mismatch.

Therefore, you have to be certain that any receivers you run into with a 600 ohm output (or any output other than 4 to 8 ohms) are reasonably compatible with the system or circuit you intend to connect the audio circuit to. **For example,** have



you checked what the input impedance is on that **tape deck** you use to record baseband video and audio signals? You might discover why the audio is 'muddy' and not of proper volume!

There is one more wrinkle to the audio impedance 'game'; and that is found in those units with 600 ohm outputs. This is called the great 'balanced versus unbalanced' argument.

Most audio circuits you will encounter in TVRO work have **two wires;** a ground and a 'hot' wire. The audio is on the hot wire and the ground provides both a 'shield' to protect the circuit from unwanted 60 cycle hum and to furnish a 'return line' for the full circuit. There are 600 ohm circuits which follow the same procedure; a ground or shield wire and a 'hot' wire. **However,** in the more professional gear there is also a **three wire** 600 ohm system; most microphones, for example, are three wire connected. What is that done for?

In a two wire system, we say the circuit is 'unbalanced'; that is, one side of the circuit (the shield wire) is at 'ground

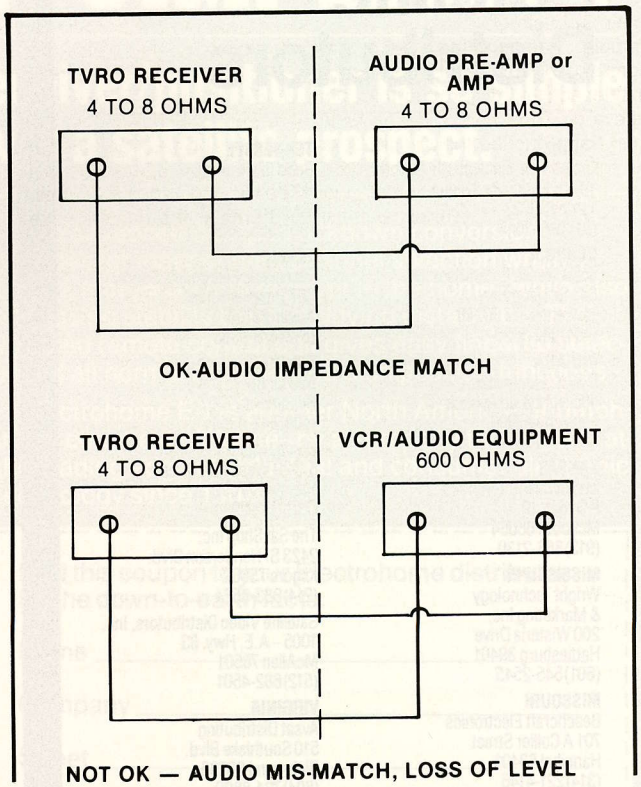
potential'. It actually connects to the metal chassis (ground) on the TVRO receiver on one end, and to the ground (metal chassis) of the follow-up equipment at the other end. The 'hot wire' is 'above ground' and carries the actual audio signal.

In a three wire system, there is still a ground connecting chassis to chassis (the shield wire) but now the audio circuit consists of a **pair** of wires. This is called **balanced** because both halves of the 600 ohm circuit are 'above ground'. In the **un**balanced circuit, **one half** of the circuit is 'at ground'; connected directly to the chasis ground.

Outside of the high dollar commercial TVRO receiver field, very few receivers are found with 'balanced 600 ohm' audio connections. There are, however, modulators (such as the Blonder Tongue TVM) which have terminals for either 600 ohms balanced **or** 600 ohms **un**balanced. You want to be sure that if the receiver is unbalanced that the modulator connection on the opposite end is also wired for unbalanced.

(When you have a 600 ohm receiver output and only a low impedance audio input system to follow, the system will still function but there will be a loss in available 'audio power' in the interfacing of the two units. With some shopping you can locate 600 ohm to 4 ohm audio transformers, even at **Radio Shack,** to make certain that the two impedances match properly. Most transformers, however, are designed for 'balanced' inputs and outputs and you need to be careful that in connecting unbalanced lines on either side that you don't pick up 'humm' in the process.)

This series on TVRO receiver system specifications will continue in **CSD.**



INDUSTRY AT LARGE

CORRESPONDENCE, NOTES, REBUTTALS AND CHARGES . . .

CSD provides this industry 'forum' for the purpose of allowing members of the industry to comment on industry activities. CSD assumes no legal responsibility for statements made here and those providing such communications are held liab le for their statements directly. CSD/2, issued on the 15th of each month, provides a forum for differing views on industry trends.

TVRO IS A Challenge

After thirty-three years of hard work, long hours, and being truthful, I have been rewarded with a very successful business. I attribute a great deal of the success to the fact that when we have told someone that we will do something, we do it. Also, we do it WHEN we said we would do it.

About four years ago we decided to get into satellite TV. I looked at TVRO and formed a snap judgement; 'It will be a challenge'. My first orders for fiberglass antennas were in lots of 50 from a firm located in Missouri. The story went like this:

Monday/ "Hi, this is Finger Lake Communications. When can I get a load of dishes for my dealers?"
"No problem. We'll load up tomorrow and you will have them by Thursday afternoon."

Thursday (PM)/ "Hi, this is Bill at Finger Lakes Communication Co, Inc.; do you know where my load is?"
"Just a minute (placed on hold). Another voice comes on and asks when they were supposed to ship.
"Tuesday" I responded.
"Oh, just a minute" (placed on hold again). Then a third voice comes on to tell me that they are loading 'that very evening'.

A week later I receive my antennas. This was a **monthly ritual** until the concern went out of business with no warning to me, a distributor. It was really no surprise to me; I still have several of those dishes in our back yard, with my dollars invested in them. Those that are still in the yard were so warped they could not be used and I of course had no manufacturer to go back on.

Another item on my list is several hundred little black boxes they called receivers. We tried to distribute them throughout the Northeast. You guessed it; the same story all over again. This firm, too, went out of business! Fortunately our facility has been in the repair business for some thirty years handling terrestrial microwave and FM communications, so we have the expertise and service equipment to honor the warranties of our dealers who bought from us, even if the original manufacturer is no longer around to do so. More recently, another receiver manufacturer has been promising us repair parts since the last **Nashville** show. A west coast receiver supplier **always** runs three weeks late with his deliveries.

When a manufacturer sees someone that looks like they might

remain in business, they decide you should handle their products. Example: I had a call from one of the 'big boys' just a week before the Vegas show. The quantity requirements were high but I did seriously consider adding their product to our line. I told the gentleman we would make a decision after meeting with them during the Vegas show. When I approached their booth, I saw a large sign proclaiming that they sell 'Dealer Direct'. If I had purchased those 400 to 500 units as I intended, I am sure my inventory would be moving very slowly now, what with the manufacturer competing with me to the dealers. Live and learn.

Recently we ordered some roof mounts from an east-coast concern. We were 'promised' several delivery dates before we finally did get the product and then we had to meet a courier at a halfway point to get the equipment just so our dealers could get the mounts we in turn had been promising to them. That same company is helping the industry by advising dealers of products that are inferior or need attention. However, I feel they should look at an equally important shortcoming in our young industry: **'Tell The Truth'** about delivery. If you don't have something in stock, be honest; **admit it is out of stock** and when you state a delivery date, make sure it is a real one. When I get a delivery date, I in turn tell our own dealers when THEY can expect delivery. If the first date is wrong, lots of people are stuck with bad information and we all suffer as a result. If a firm does not have the product available, tell us. We'll come back. If the guys in the shipping department are goofing up, replace them! It is just that simple.

A dealer can understand a manufacturer delay and perhaps make other arrangements. However, when he schedules installs based upon mis-information from us, the distributor, because **we have been mis-informed** by the manufacturer, everyone is hurt and it causes a black mark on our industry and an unhappy end user.

Finger Lakes Communications Co.
189 Clark Street
Auburn, New York 13021

Rising to the defense of the manufacturer who gives you incorrect shipping information, there is the possibility **that he was basing his projected shipping dates on an outside supplier bringing him steel or bolts. That's an easy out however; there is almost always somebody earlier** 'in the line' **who can be blamed for any shipping delay. The proper approach is for the OEM to admit the exact problem he is having and then to make an effort to clear up the problem promptly. We feel that if more people, as Bill suggests,** 'told the truth' **and resisted the urge to say what they perceive the buyer** 'wants to hear', **things would run much more smoothly in the industry.**

MORE European Programming?

I read with a great deal of interest 'Transponder Watch' in the April 1st issue where it was noted that Intelsat had approved a variety of DOMSATs to carry Intelsat relayed programming. In this vein, I have noticed Italian RAI-1 on F1, TR24 daily at about 11AM mountain time. The programming consists of news, sports, weather and the occasional spot announcement. I am curious why Satcom F1(R) is carrying the Italian service and what restrictions apply, if any, to private viewing of this programming. Additionally, UP ITN (now WTN) puts up local ITN news at a variety of times on F1(R), TR11.

I would be interested in knowing about future programming from any of the European TV companies (NRK, ARD, RAI, TVE, RUV and so on). Having lived and studied in the United Kingdom for several years, I am familiar with the EBU (European Broadcasting Union) output; for example the European Song Contest which is held in May. Hopefully, programming such as this and UEFA and FIFA cup matches will be shown through these birds.

Frank M. Luman
6627 South Cherry Way
Littleton, Colorado 80121

European television, whether from RAI or any of the European national television broadcasting organizations only finds its way to American DOMSAT birds when somebody, **in business or education here, has agreed to** pay **for the feed. The arrangements are quite complicated. First the program source has to be uplinked. In the case of RAI, the feed could have come directly out of Italy, via an Intelsat bird, to Maine or West Virginia where it would be transfered to a domestic bird for replay. Or, it could have been taken off the ECS program channel occupied now by RAI at virtually any location in Europe and then sent via Intelsat to the USA where at the downlink sites in Maine** (or West Virginia) **it would be cross-connected to a US domestic bird. In either event, somebody had** 'ordered' **the feed and was paying for it; probably close to $1,600 per hour for the Atlantic crossing and another $400 or more per hour for the replay on the Domsat bird.** Can you watch it without permission? **Yes, no problems. As long as it is for your own use in your own home and you have no financial gain by doing so. F1R, Westar 3, even F4 carry a significant amount of this sort of cross-strapped programming from Europe and Westar 4 and Westar 5 seem to get a high percentage of the Pacific programming** (Japan and Australia). **All of this makes owning a TVRO even more worthwhile! Are there guides? Not unless this sort of thing is done on a** scheduled **basis** (it very seldom is).

MIS-INFORMED Dealer?

As a full-time store-front dealer, I rely very much on **CSD** product reviews. It was because of a **CSD** review, for example, that I sell USS/Maspro products. A reprinted copy of **CSD** reviews is given to each customer that comes into our store.

On April 24th, the enclosed advertisement appeared in our local paper. Distribution was approximately 59,000 homes. Basically, what it suggests is that the only good reviews done by a magazine such as **CSD** are reviews for firms that advertise heavily in your magazine. Because of this local newspaper advertisement, it is now very hard for me to convince my customers that your reviews are accurate. Considerable damage has been done. What is your response?

Earl Forester
SATVIEW Systems
1724 Cotton Grove Road
Lexington, N.C. 27292

The advertisement contains these statements:

"A lot of people want to be in the satellite business and each 'Satellite Seller' has his own ideas about how to best sell his systems. We at XXXX Satellite would like to express our opinions regarding some of these marketing methods.

"Recently, we have noticed that some satellite sellers are using magazine articles and reviews to persuade the public to purchase their particular equipment. We feel that these dealers may lack the ability or knowledge to present the product themselves, therefore relying on the 'experts' who write the reviews to do the selling for them. Perhaps this somehow reinforces the dealer's confidence in themselves and their expertise.

"Test reports in most magazines are all of a competitive nature, too. If a manufacturer spends 'big bucks' advertising in a particular magazine, then almost always its test results are very good. We have even seen test results from the same magazine get better as the manufacturer's ad becomes larger! In any case, these test reports are written by staff members that are hired to write and to sell magazines. If these people are truly experts on forty different types of satellite receivers, then all of the manufacturers would probably have them design their receivers. Just think . . . if automobile manufacturers did this, then we would probably all be driving Hondas!"

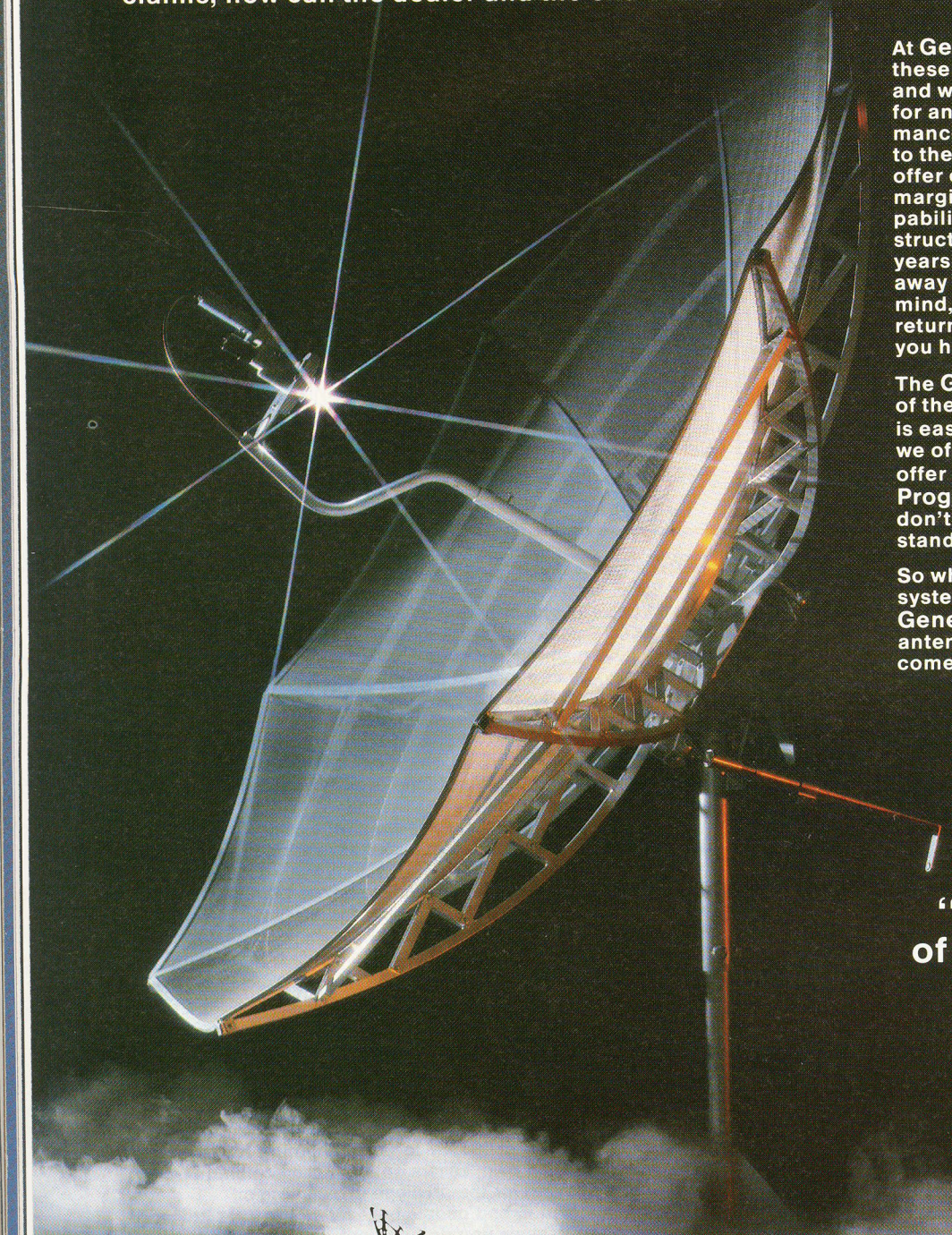
First impression? The guy is a good writer. He carefully explains in several places that what he is writing is 'opinion' **and in a portion of the advertisement we don't reproduce here, calls it an** editorial. **That gets him off the hook for being** 'liable **for** 'libel' **(defaming statements). So he can** 'voice his opinion' **in an** 'editorial' **without fear of being called on to** prove **anything he says. In effect, he created his own** 'Letters To The Editor' **column in the newspaper by paying for the privilege of** 'sounding off'.

And people read it, and people believed it. Whether he had your store **in mind, since you do hand out reprints of technical reviews in CSD** (and we suspect other magazines as well; we recall that **STV** also did a review on the USS/Maspro receivers and that their review came to the same conclusions as **CSD;** one of the best receivers around), **or was simply 'fishing' to catch everyone in the**

CORRESPONDENCE/ continues on page 54

GENESIS™

Many manufacturers make claims of high performance, while others boast of their good looks and ease of assembly. Some claim structural integrity, and a few claim UPS shippability. Finally some sell their products based on a low price tag. With all these individual claims, how can the dealer and the end user decide on which brand to purchase?



At **Genesis™**, we realize that all of these factors are of equal importance and we do not compromise one quality for another. We offer a high performance, reliable and attractive antenna to the end user. To you as the dealer we offer ease of assembly (for higher profit margins), the convenience of UPS shippability (for lower freight costs), and the structural integrity that will provide years of reliable service. You can walk away from your customers with peace of mind, knowing that you will not have to return due to quality problems because you have sold them the very best.

The **Genesis™** antenna provides all of these superior traits, at a price that is easy on the pocketbook. At **Genesis™** we offer more than a quality product, we offer a **Complete Factory Support Program** that is second to none. We don't just sell you our products—we stand with you and support your efforts.

So when you are considering a satellite system, don't be confused. Turn to **Genesis™ FIRST.** We are the satellite antenna manufacturer whose time has come.

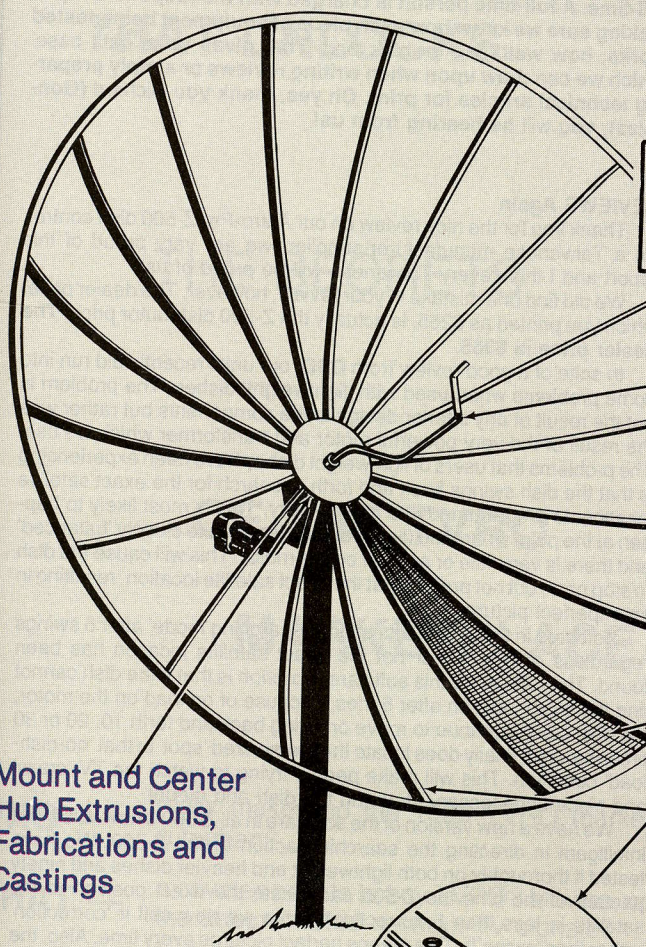
"A New Generation of Satellite Antennas"

GENESIS™
MANUFACTURING

2810 LAWING LANE / ROWLETT, TX 75088 / (214) 475-4163

As part of our factory support program you may call Toll Free: National: 1-800-527-8939 / Texas only: 1-800-442-8863

Where Custom Satellite Systems Originate



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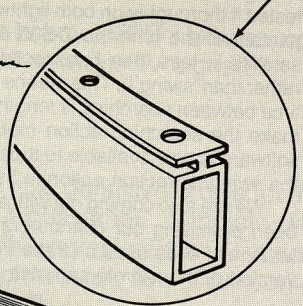

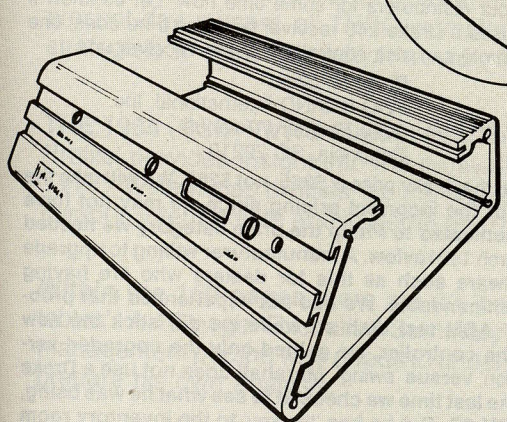

Fabricated and Extruded Housings

NSM currently provides custom aluminum extruding and fabricating services to many leading TVRO companies. NSM can handle aluminum extrusion of various electronic components such as front panels and housings, aluminum fabrication of antennas and aluminum die-casting such as LNA castings.

In fabrication NSM can punch, machine, bend, drill, tap, cut and miter.

In finishes NSM can anodize, hard coat, paint, polish, buff and powder coat. NSM is one source that solves handling, quality and cash flow problems.

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NSM CORPORATION

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AFFILIATE OF NORTHERN STATES METALS CORP.

CORRESPONDENCE/ continues from page 51

trade area with one 'attack' we cannot say.

Buying reviews? That is an easy charge to make because most people are just that uninformed about how publications, any publications, function. Let's first see if that holds water. USS uses one page per month with CSD. You'll have to perform your own page count for STV and USS. We average around 50 pages a month in advertising between CSD and CSD/2 so that says that anyone who uses a page a month should also get an equipment review. It certainly follows that if we or STV were doing such a thing (trading reviews for advertising) that it would hardly be a secret amongst the suppliers and it also follows that if you did it for one, you would have to do it for all. And if you did not? Those who didn't get that 'treatment' would be quick to cancel their advertising.

Boman uses two pages a month with CSD. We have never reviewed anything sold by Boman. R.L. Drake uses several pages a month; we have never done a review of a Drake piece of gear (and they are the largest supplier in the industry). On the other hand, Southern Star Satellite with their 7'8" dish made the front cover for February 1st, plus a five page review/article AND we did four consecutive weeks on the BORESIGHT television program on their shrouded antenna concept. How much advertising has Southern Star bought? None. They don't even have an advertising budget!

No, reviews for advertising space are not a way of life with us nor with STV. There are too many suppliers in this field to allow you to do that even once because once you started, there would be no end to it. We select products or product concepts (as is generally the case) to write about because they offer some interesting new technology to the industry. Publications such as Consumer Reports review products per se, and rate them. Publications such as STV and CSD look at products because of their technical merit and because by exploring that technical merit the members of our industry can be better informed, more service-oriented dealers.

The chap who wrote the 'paid-for-editorial' apparently cannot compete effectively with other dealerships on the basis of selecting proven, rugged, high performance equipment for resale. He has decided that the best way for him to sell his equipment is to make everyone else look stupid or incompetent. He suggests that if 'us technical writers' were so smart, we would be designing every one of the 40 receivers on the market. If this retailer was so smart, he would be running everyone of the nation's 3,500 storefront retail operations.

WITHOUT Asking

First I wish to compliment the **CSD** staff on the excellent article concerning descrambling appearing in your April 15th issue. The tests conducted by **CSD** on various TVRO receivers, with a M/A-Com descrambler unit, certainly helped clear up a lot of confusion regarding this complicated issue. Additionally, your comments and suggestions regarding the Las Vegas Show, and suggestions for future shows, will hopefully be considered by SPACE in the future.

As you are hopefully aware, we introduced a new antenna-positioner-control (model DSB-400) at the Las Vegas Show. I am taking the liberty of sending you one of the first production samples so you can hopefully use it for testing with our DX receiver model DSB-700 which I believe you already have. We would welcome your comments regarding this new product after you have had a chance to evaluate it.

Again, our compliments on your April 15th issue.

J. Richard Gonzalez
Vice-President Marketing
DX Communications, Inc.
10 Skyline Drive
Hawthorne, New York 10532

Normally, we would have answered this letter privately and not considered it for publication. However, it serves as an illustration of how virtually all of the equipment received for test shows up at CSD; unsolicited (see previous letter and response). We routinely apply whatever level of expertise we may have to testing and evaluating products such as this and sending a detailed written report to the manufacturer. Without boasting, there are now 24 TVRO antennas in full-time operation at the CSD test lab and close to 100 receivers with LNAs, LNBs and so on running also full-time. A full-time person is charged with the responsibility of making sure we know how each piece of equipment being tested works, how well, and for how long. That gives us a 'data base' which we can draw upon when writing reviews or simply preparing technical articles for print. Oh yes, thank you Richard (Gonzalez); you will be hearing from us!

REVIEWS Again

Thank you for the nice review on our Astro-Pro Z-500 dish control. As a Taiwanese manufacturer-supplier, we are very proud of this report and I think every Taiwanese will be proud of us

We did find one mistake in your review, however. The dealer price, which you printed as $265, is actually the Z-500 distributor price. The dealer price is $365.

In spite of a good review from **CSD,** our units recently did run into some problems when used with 'lightweight' dishes. The problem is not the result of any inferior design in the components but rather was the result of the very powerful motor and transformer which we use. The problems that users of lightweight dishes have been experiencing is that the dish swings back and forth to search for the exact satellite location as programmed into the memory. This is most likely to happen at the point where the (lightweight) dish is quite closely 'balanced' and there is very little or no load on the motor. This will cause the dish to stop near, but not precisely at the exact satellite location, resulting in an imperfect picture.

Software in the Z-500 cuts off this 'searching mode' after 5 swings regardless of whether or not the exact satellite location has been found. The reason for this software provision is that if the dish cannot find the exact location after 5 tries, because of no load on the motor, the dish could continue to move or swing back and forth 10, 20 or 30 times before it finally does locate the memorized 'spot' in that 'no-dish-load' condition. This will make people trying to watch the TV 'crazy' and place unnecessary strain on the dish and mount.

We have a new version of the software in all Z-500's now. It is more intelligent in directing the searching action of the Z-500. We have tested it thoroughly on both lightweight and heavier dishes and ninety percent of the time the Z-500 can locate the exact position of the satellite in less than 5 corrections (note we now call it 'correction' rather than 'swing'!). This means perfect pictures every time. Also, the time between searching is lengthened from 1 second to 2 seconds to make the searching action more smooth. This new version of the software is now available to those dealers who have had trouble with the swing/correction action in the past.

We are also coming out with an IR remote retrofit kit which we have been promising our distributors for some time now. Let us know if Marshall Foiles uses a Drake 240 receiver because if he does, one version of the remote can also control the Drake receiver unit.

Philip M. Shou
PRO BRAND International, Inc.
1629 Newberry Avenue
Columbia, SC 29210

Dealers note; the dealer price is $365, **not $265. We will take the responsibility for the incorrect pricing since we may not have properly communicated to Philip the price category we needed for the CSD** (March 1st) **review. A manufacturer willing to upgrade a piece of software such as this for dealers who are having problems is commendable. We had not experienced that problem on our 11' ADM test dish so while we did stick the new software into the controller, we gained only the upgraded version of** 'correction' **versus** 'swing'. **Marshall does not use a Drake 240 receiver. The last time we checked to see what he was using, it was an AVCOM 2B. But he has** 'the key' **to the inventory room and other than his Z-500, he is apt to be changing out equipment several times per month!**

CORRESPONDENCE/ continues on page 57

THE BIG BLACK BOOK THAT UNLOCKS THE SECRETS OF THE TVRO MARKETPLACE

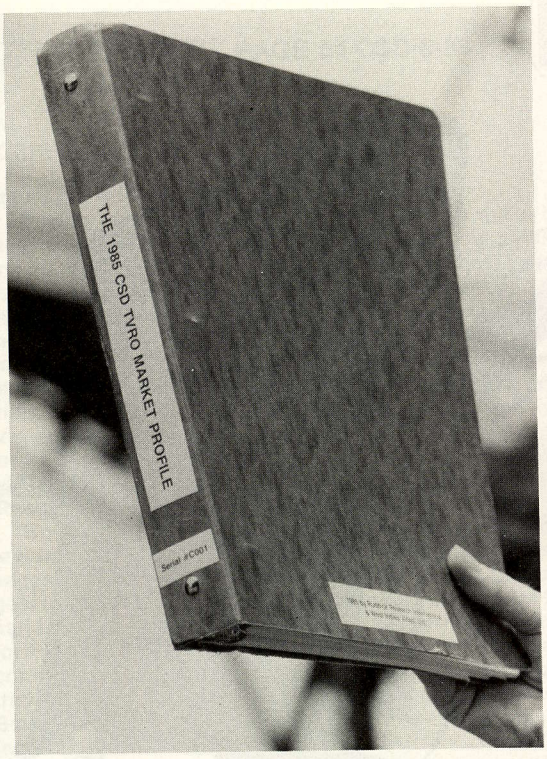
WHO — really makes up the 1985 TVRO marketplace? Is the marketplace shifting from rural to suburban?

WHAT — motivates people to buy TVRO? Movies, sports, news??? How important to TVRO owners are the **unscrambled** network TV signals?

NOW for the first time there is a 'definitive profile' of the TVRO marketplace; a detailed, perceptive look at the demographics of the TVRO consumer, complete with behavorial segmentation profiles! More than 2,000 present-day owners of TVRO completed a 43 question, four-page survey designed by skilled marketing strategists to elicit data which would allow a full computer tabulation of the 'demographics of TVRO.'

THE 1985 (CSD) **TVRO Market Profile'** contains 150 pages of charts, analysis, tables and summaries. 'The Profile' provides insight into the motivations of TVRO purchase and reveals important 'user satisfaction' and TVRO system 'use profiles' for the first time. 'The Profile' is skillfully edited and arranged into sections to allow cursory, intermediate and in-depth analysis of all of the important factors influencing TVRO purchase and use.

Within the 150 pages there are 32 'basic tables', 49 'cross-tabulation tables' and 38 'behavioral tendency tables'. A 16 page 'Executive Summary' backed up by 22 pages of 'summary tables' is tailored for the busy management person who needs to understand the basic motivations of TVRO but who does not have the time to prepare his own analysis.



METHODOLOGY/ Nearly 5,000 home TVRO system users were identified through an arrangement with a cross-section of TVRO hardware original equipment suppliers. A random sample of warranty registration card files provided a master 'survey universe' covering the period 1980 through 1985, spread over all regions of the United States and outside the USA where DOMSAT (domestic US satellites) can be received. Survey results are based upon 2,086 responses (43.6%) received by the specified cut-off date. The study was conducted under contract by Ruddick Research International.

Partial listing of questions included in original survey form: How long had satellite earth station? **Region of country?** Primary use of system? **Factor that convinced you to buy system?** Number of broadcast television stations you receive? **Currently have access to cable TV system?** A subscriber to the system? **Pleased with cable service receive(d)?** Total number of hours per week satellite system used by all members of household? **Satisfaction with satellite receiving equipment?** Satellites tuned-in three or more times per week? **Category of programming viewed most frequently by household on satellite?** Categories of programming viewed next-most frequently? **Important source of satellite programming information?** Main benefit expected from satellite equipment? **How much spent on satellite receiving equipment?** Other electronic equipment currently have or own in home? **Live in incorporated city or town?** Population of city or town? **How far from residence to nearest city of 100,000 population or more?** Anticipate replacing or adding satellite receiving equipment within next 12 months? **Equipment plan on buying?** Age of head of household? **Family status of household?** Income of household? **Education of head of household?** Occupation of head of household? **Publications subscribed to or read regularily?** Programming sources viewed through satellite: **ABC,** CBS, **NBC,** WTBS, **WGN,** USA Network, **CBN,** ESPN, **HBO,** Cinemax, **Showtime.** Type of products usually purchased? **Buy sooner if on credit?** Generally a 'risk taker' in purchasing? **When shopping, generally buy more than anticipated?** Use 800-toll-free numbers when shopping? **Tend to buy merchandise based upon lowest pricing?** Consult literature and publications for education before buying? **Generally compare prices before buying?**

Partial contents of '1985 (CSD) **TVRO Market Profile': Market Characteristics**/ Location of residence in cities-towns; Age of head of household; Family income levels; Family status of household; Location of residence by region; Educational level of head of household; Occupation of head of household; Magazines subscribed to or read regularly. **Behavioral Segmentation Profiles**/ Urban novelty seeker, Impuslive credit buyer, High-tech innovators, costly system owner, upscale low-end user. **Purchase Dynamics**/ Length of ownership; Factors in purchasing decision; Number of broadcast stations able to receive prior to TVRO; Major benefit expectations; Cable TV access-subscription-satisfaction; Electronic equipment cross-ownership; TVRO system upgrade potential (age of system, cable access-subscription-satisfaction, equipment cross-ownership). **Usage Patterns**/ Viewership; Satisfaction; Satellites viewed; Types of programming viewed; Services viewed (Viewership, Programming viewed).

HOW TO ORDER:
'The 1985 (CSD) TVRO Market Profile'

PLEASE enter our order for a single copy of the 150 page **'1985** (CSD) **TVRO Market Profile'.** Our check for $1,000, to West Indies Video, Ltd., is attached. We understand that this 'Profile' is being sold to us with our agreement that no portions may be duplicated for distribution nor published without the written consent of the copyright holders. We also understand that our copy will be sent via Federal Express within two working days of receipt of our order and payment.

Ship to:

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COMPANY _____

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CITY _____ STATE _____ ZIP _____

Telephone Number: (_____)

We agree to the confidentiality terms of this 'Profile':

_____ _____

Signature Title

Order from:

West Indies Video, Ltd. Fort Lauderdale, Fl. 33310

P.O. Box 100858 (Telephone 305/771-0505)

CORRESPONDENCE/ continued from page 54

BORESIGHT 'Fan'

I just watched the BORESIGHT program telecast on April 4th and applaud the work you do to support the TVRO industry. However, there is one thing I must say; your negative overtones towards manufacturers such as M/A-Com can ruin your credibility. If you resort to such unstylish cuts against M/A-Com, it ruins your image. Maybe a tongue in cheek approach would be better; after all you are in front of a great number of viewers.

Yes, I sell M/A-Com. But I also sell Drake, Uniden, Wilson, Amplica, Toki, Janeil, and STS. But if I had to choose equipment based upon the highest quality, M/A-Com would get my vote up to the present time.

Granted, there is a tremendous amount of change taking place in the TVRO marketplace. I have learned to roll with the punches. For example, what will a fair price for a descrambler be? Whatever the market will bear. And 10 to 1 they start out high!

M/A-Com has tried to say that their ball was the only one that would go through the hoop. They were playing a risky game and now the rules show that others can play as well. A more equal opportunity should be given by you when you cover a story such as this, not just about one manufacturer **(who cares if they** are **complete horse's rear ends!).** If they have a better product, applaud them on their good points as well as their bad points. You should have put the M/A-Com T1 up against the new Drake 440, for example.

This is a rare occurrence. I hardly write my own sister much less somebody that I don't even know. Again, congratulations on a very successful television program for TVRO. Keep up the good work, even if I sometimes find it irritating at the same time I find it very informative.

Gary Philipps
Phillips Furniture & Appliance, Inc.
905-30th Street
Monroe, Wisconsin 53566

The three part BORESIGHT **series describing the shortcomings of the M/A-Com descrambler versus the receivers available in our industry drew heavy mail. It ran 6 to 1 favorable for us which means absolutely nothing. The series describing the VC2000 series of units winds up in this issue, for now. Hopefully enough has been said to set the record straight on this incendiary subject for a while. Oh yes,** your sister **says she hasn't heard from you in two years. Drop her a note.**

OOOPS

We came across the enclosed news clipping in the April 4th edition of the **Manchester Union Leader** and thought **CSD** might be interested.

Gary B. Crockett
Highcountry Satellite & Electronics
187 Main Street
Colebrook, NH 03576

The headline reads 'M/A-Com Executive Resigns' **and the story goes on to report that** Dr. Irwin Mark Jacobs, **a founder of the** Linkabit **division of M/A-Com had** 'resigned to pursue personal interests'. **Shortly after the resignation of Dr. Jacobs, the corporate man directly under him** also resigned. **Jacobs was credited as** 'fathering' **the Linkabit system through the corporate maze and immediately after his resignation there was considerable speculation as to his reason for leaving.** We won't add to that speculation.

AFRTS IS Scrambling!

I spoke to Lt. Col. Larry Pollack, of AFRTS (Room 210, 1735 N. Lynn Street, Arlington, Va. 22209; 202/696-5280) and AFRTS will indeed scramble. In fact, their first test of scrambling was scheduled for two hours on April 11th. He told me all equipment for the scrambling is to be in place by the end of 1985. Furthermore, they do not intend to make the service (or the descramblers) available to the public.

John Morgan Papua New Guinea

CORRESPONDENCE/ continues on page 62

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THE LUXOR® 9534 ANTENNA ACTUATOR

Now you can have fully automatic satellite selection at your command by remote control. The location of 30 different satellites can be precisely defined and programmed for automatic recall at the touch of a button. The unit is design coordinated to interface with the Luxor 9550 Satellite Receiver.

THE LUXOR® 9550 REMOTE CONTROLLED SATELLITE RECEIVER

The Luxor 9550 gives you total control over the satellite spectrum. 24 channels can be selected, fine-tuned and then programmed for automatic recall. Four different audio systems, mono or stereo, can be selected in either wide or narrow bandwidth for programming with any channel. A built-in stereo processor for both TV audio or stereo sound-only eliminates the necessity for an add-on external stereo processor. An RF modulator in the receiver provides easy connection to any TV set. The 9550 is not only a satellite television receiver, it will feed a hi-fi stereo system with quality audio-only signals. You can also make professional quality VCR recordings via the audio/video baseband outputs. Compare these features with systems costing much more. You'll see the extra value in investing in a Luxor.

THE LUXOR® HAND-HELD REMOTE COMMANDER

Once programmed, the Luxor Receiver and Actuator can be completely controlled from your armchair by this compact (IR) Infrared remote control. No wires are necessary. You have automatic recall of up to 24 television channels from up to 30 different satellites.

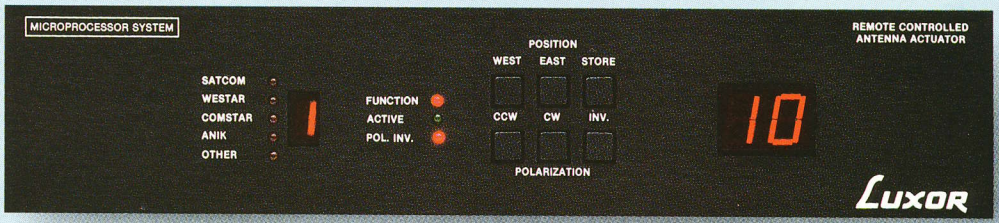
THE LUXOR® 9536 AUXILIARY REMOTE SENSOR

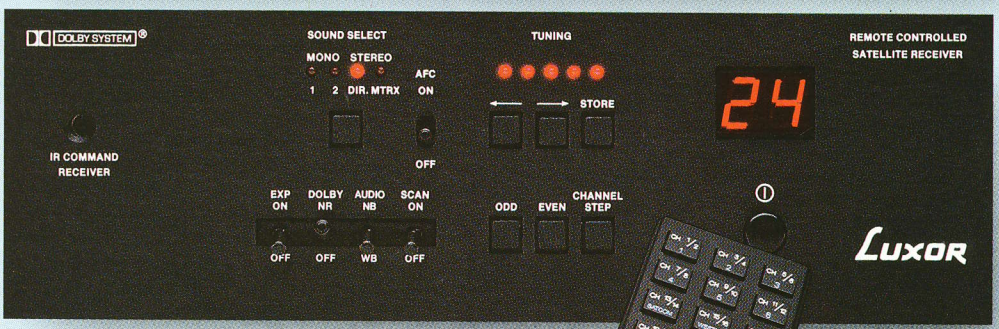
Other television sets, located throughout your home, can receive satellite television by the simple addition of this low-cost IR sensor at each set location. A hand-held Remote Commander can control the receiver and the actuator through the 9536 sensor from any location. You have complete automatic control from every TV set in the house.

LUXOR® (North America) Corp. Bellevue, WA
A leader in radio and television technology since 1923.

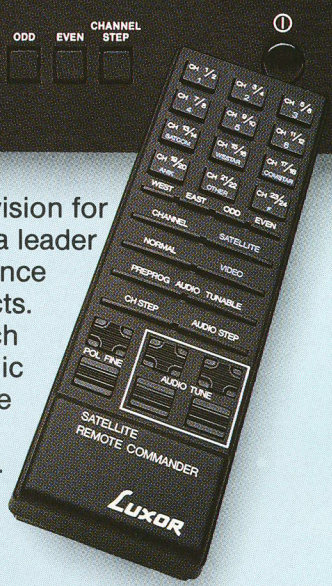
LUXOR®

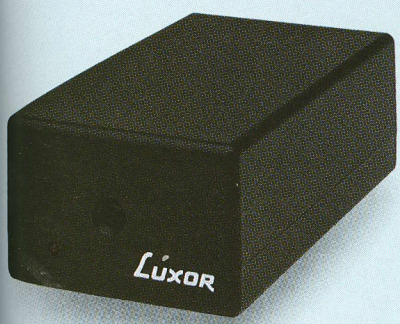
Satellite Television Reception System





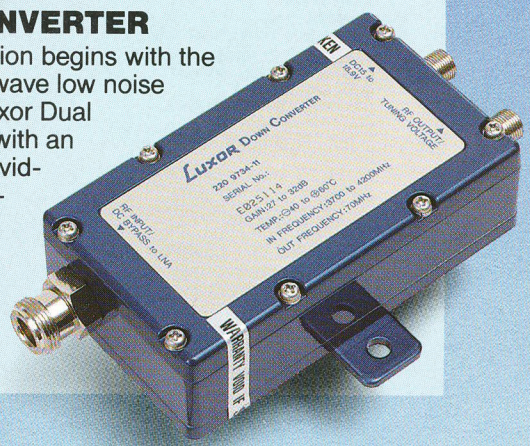
Since the beginning of Satellite Television for in-home enjoyment Luxor has been a leader in the development of high-performance technically advanced satellite products. Only the Luxor brand brings you such an extensive combination of electronic features and automatic controls. Here is the finest space-age technology for your home, at an affordable price.





THE LUXOR® DUAL DOWNCONVERTER

The miracle of satellite television reception begins with the high-performance technology of microwave low noise amplifiers and downconverters. The Luxor Dual Downconverter is used in conjunction with an LNA. Each Luxor Downconverter is individually tested and aligned to provide maximum performance. Luxor microwave products are made to the highest standards of materials and workmanship. Reliability and performance are assured.



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Kansas City, MO (816) 483-6605

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(TX) 800-592-1476/4745
Service (915) 263-1012
San Antonio, TX (512) 650-3291
Oklahoma City, OK (405) 672-9617
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Mark 2

INTRODUCING A NEW GENERATION OF ELECTRONIC EXCELLENCE

Now several television sets throughout your home can have independent channel selection at the same time from a single antenna. Neighbors can share one antenna and enjoy the channel of their choice from a single satellite. Advanced block conversion and high performance technology bring you quality picture stability. Temperature-sensitive components are in the receiver, inside the house. A built-in stereo processor for both TV audio and stereo sound-only eliminates the necessity for an external add-on stereo processor. The entire system is easy to install. It's great! Simultaneous multi-channel TV viewing is here.

FCC Approved

Luxor®

Mark 2™

BLOCK SATELLITE RECEIVER SYSTEM

LUXOR GIVES YOU MUCH MORE

The Luxor Mark 2 gives you more automatic features than systems costing much more! Individual remote control; Programmable memory; Four audio systems including stereo and Dolby noise reduction; Narrow/ Wide band audio. A built-in modulator means easy connection to any TV set. See for yourself why Luxor is one of America's top selling brands. Luxor.

THE LUXOR 9534-2 ACTUATOR CONTROL

Add a Luxor Actuator Control Unit and the entire system, antenna and receiver, can be controlled with a hand-held IR Remote Commander.

Luxor®
(North America) Corp
Bellevue, WA

A leader in radio and television technology since 1923.

CORRESPONDENCE/ continued from page 57

John had voiced concern in the May 1st CSD **that AFRTS might scramble. The decision to scramble AFRTS feeds worldwide seems to be a military decision based upon pressures received from the U.S. Department of State. We doubt this one can be salvaged but we are investigating none the less.**

YAGI Revisited

On occasion I read some mention or discussion of 'Yagi' design antennas in **CSD** so I thought you might be interested in the comments I ran across in the book **'MIDWAY',** published in 1955. I have enjoyed **CSD** since discovering it in 1981 and appreciate the integrity of the magazine. I also enjoy reading about WIV and I had to smile when I heard about your Chief Minister being 'pinched' in Miami.

Carl Mason Gardner
14222 Lee Highway
Gainesville, Va. 22065

Carl's copy of an extract of MIDWAY **(written by Mitsuo Fuchida and Masatake Okumiya of the Imperial Japanese Navy) deals with the fateful battle during World War Two between the US and Japan over the island of Midway. The Japanese** 'lost' **and some say that turned the tide for the US in the naval battles in the Pacific. The book notes that** 'during the war, Japan started out in an inferior technological position'. **It explains that the clearest example of this was** radar; **Japan had none and as the war developed they were late to get it and install it. The first radar installations for Japanese naval ships were made just two days prior to the** 'Battle for Midway'. **The authors wrote** "Development in this field of electronics lagged so pitifully that the two sets available at the last minute were only experimental models. Had Japan had six more months to perfect the radar before the 'Battle of Midway', it would have been an invaluable asset. Without radar, US scouting planes 'snuck up' on the Japanese fleet, determined their location, and returned to the US fleet with the information. Had the Japanese radar been more developed, fighter planes would have probably intercepted the US scout planes and the valuable information concerning the Japanese fleet would have never reached US hands."

The book also notes an irony of the state of Japanese electronics at that point in time. "One vital component of radar is the directional antenna. Early success was achieved by a Japanese college professor, **Dr. Hidetsugu Yagi,** who made public his discovery in Japan in 1932 and soon thereafter in the United States where his findings were honoured by publication in several technical journals. Japanese forces invading Shanghai found electronic installations there employing the 'Yagi (directional) antenna' from the Americans and English; while Japan had neglected to pursue this important invention on its own."

If Japan lost the 'Battle of Midway' **because their experimental radar did not work, in turn because they had not used their own Japanese 'Yagi' technology to give the radar adequate 'ears', and that in turn started the tide turning away from future Japanese conquests in the Pacific, one could draw all sorts of speculative comments and observations about** 'a lesson well learned'. **Yagi antennas of course led to** parabolic antennas **and some parabolic antenna designs actually use** 'small Yagi' **antennas as their feeds. In front of my typewriter as I fashion this comment is a photograph taken from the** NASA Shuttle **some 150 miles above** Tokyo Bay **November 12, 1981. If I really** squint hard **and** imagine **just a tad,** I think **I can see a bank of Yagi antennas 150 miles below just north of Osaka!** Times do change.

TRANSPONDER WATCH

RECENT REPORTS OF ACTIVITY ON DOMESTIC / INTERNATIONAL SATELLITES

Send your reports to CSD Transponder Watch, P.O. Box 100858, Ft. Lauderdale, FL 33310. For late news, call (305) 771-0505.

"A company inviting a lawsuit" is how SPACE's Rick Brown describes the recent HBO announcement that they will sell home TVROs service through a complicated arrangement that involves local cable firms. Look for plenty of legal feedback before HBO actually gets into the marketplace.

INTERFERENCE with 2 (or 2.5) degree spaced birds is causing more and more concern with satellite system operators. Latest reported problem involves ABC feed on T301 (96 west) interfering with narrow band audio feeds attempted on Westar 4 (99 west). FCC claims they have little information and do not yet believe there are problems; programmers claim contrary.

TRANSMISSIONS to the USA during the 'celebration' of the tenth anniversary of the fall of Vietnam, originating in Ho Chi Minh City, got here through Russian satellites. ABC used Soviet uplink, rushed to completion just days prior to use, through Pacific Ocean Intersputnik system to England and then across Atlantic on Intelsat.

MORE aggressive stance of European EUTELSAT organization in providing cable type programming to Europe. Eutelsat now suggests medium power satellites in 60 to 100 watt class (per channel) rather than 1977 approved 230 watt class transponders, largely in recognition that higher power transmitting equipment is still unreliable, and, the sensitivity of receiving terminals is far better today than back in 1977 when the higher power transmissions were authorized.

HUNGARY may become first nation in 'east' to place western cable television services on CATV. The Hungarian PTT is negotiating with Skychannel, MusicBox and several other 'western' programmers for rights to plug in Hungary's estimated 400,000 cable TV homes to satellite services. Budapest hotels would be first served, perhaps as early as this September.

CORONET project, headquartered in Belgium and proposing 16 channels of 'DBS' on Ku band for Europe, is dead. Period.

M/A-COM Cable Home Group has won contract from RCA Americom to provide nearly 850 Ku band terminals for use by TV broadcast stations with new RCA Ku2 satellite. Bird is scheduled for launch late this year and will carry four or more channels of inter-station networking. Terminals will go to TV stations 'free of charge' as part of promotional program to encourage stations to begin using the new 12 GHz service.

ATS-1, the first NASA test bird, failing to respond to commands to stay 'on station' and will apparently drift into a not-useful orbit soon. Bird was launched in 1966 and has exceeded normal lifetimes several times over.

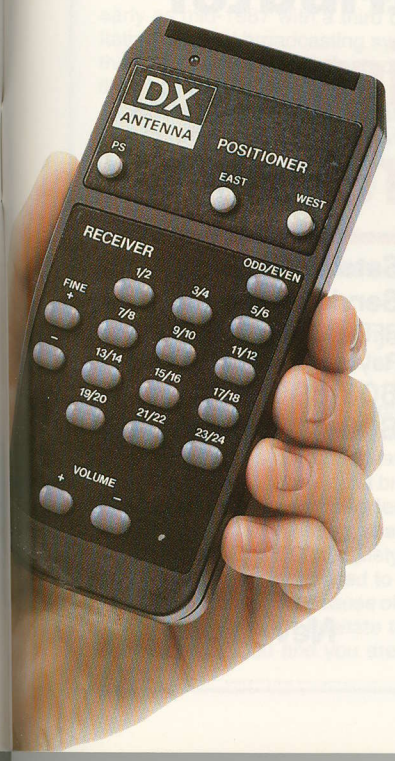
MICRODYNE is latest firm to show an encryption system. Firm says it is intended for pay per view and private satellite linking, is NOT

TRANSPONDER WATCH/ continues on page 65

THE NEW DX ANTENNA POSITIONER.

Everything you expect from the leader.

Antenna by Paraclipse.



Finally, there's a totally integrated home satellite reception system, with perfectly matched components that look great and work beautifully together. And it's from DX, with all the quality features and superior performance you've come to expect from us. Result: the picture-perfect system you've been looking for.

The New DSB-400 Antenna Positioner

Incorporating advanced microcomputer technology, it delivers out-of-this-world features at a down-to-earth price. Features like full programmability for 24 positions including polarization and skew adjustment; reliable single chip circuitry, and a nonvolatile 10-year memory. It has user-friendly controls, programmable limits, and a full-function remote control unit with parental-supervision button.

The DSB-700 Receiver

It has the DX quality features you've looked for, but for much less than you'd expect to pay. **Block downconversion** for multiple-TV hook-up, picture quality comparable to commercial receivers, and descrambler compatibility. It's capable of both 4 GHz and 12 GHz reception and has an infrared remote control.

From every standpoint—quality, performance, price—we've got what you've been looking for.

DX ANTENNA

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Volume discounts are available.

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Coming Soon
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based upon highly complex DES Algorithm process.

CONTROVERSIAL FCC licensing fees for private two-way satellite systems, largely for data and private corporate communications, has been modified by FCC. Under original plan, each terminal, no matter size, would have been required to pay more than $1,000 in licensing fees. Under new plan, one 'master fee' is paid and additional terminals ride along for token licensing fee.

EUROPEAN space buffs closely following something called 'Proton Vehicle'; a launch system developed and used by Soviets to lift extremely heavy loads into orbit. Soviets appear to be encouraging non-Soviet satellite launchers to use Soviet launch services, and Proton vehicle, at rates far lower than Shuttle and Ariane.

TINY Papua New Guinea has asked for two orbital spots over Pacific; country plans to 'sub-let' their spots to a private concern that plans a two-satellite system for private use in Pacific.

IRISH plan to use their assigned orbital spots jelling; they want to provide transponders for sale or lease which would cover USA as far west as Michigan and Louisiana and as far east as eastern Mediterranean. Paper plans talk of receive dishes for TV and data as small as 2 feet(!); Hughes is believed to be designing bird for Ku band service.

BRAZIL will launch its own meteorological satellites soon and is planning on capability to export full satellite systems to Africa and other areas of the world within next ten years.

US and RUSSIAN embassies may be sharing a joint French-owned transponder on Eutelsat F1 bird shortly. Plan is to allow American embassies to have one day part, Russian embassies have alternate day part for transmission of television and data throughout Europe.

WESTERN UNION operations may be in worse shape than suspected; latest financial data shows company is operating at substantial loss ($58.4 million last year) even though it has taken drastic steps to cut overhead.

RCA Ku2 bird, to be at 77 west after launch late this year, will be home for all NBC programming as well as 4 channel Hubbard service to broadcasters and a new Wold direct-to-station single channel service. With RCA offering some 850 TV stations 'free terminals' for Ku2, use of this satellite for extensive broadcasting relay purposes assured.

USCI shut down back on March 31st occurred when uplink operator got frustrated because of lack of payment from USCI. Atlantic Satellite Communications, uplinking to ANIK from Northvale, NJ pulled plug to reenforce its demand for payment. USCI also apparently owed ANIK management more than $4.6M for back transponder time charges.

ITALIAN RAI will place two channels of programs into space as early as mid-1987 with a third channel possible within a year. Giant Italian national broadcasting system says it will program second and third channel specifically for broad 'western Europe' audiences rather than home consumption.

EQUATORIAL Communications, providing spread spectrum data flow to two foot dishes nationwide, has advanced into Canada. 500 terminals have been sold to Telesat (Canada) for re-distribution there. Business clients subscribe to service.

FNN has expanded schedule to add 'Sportstime' as after-business period sports oriented service including 13 hours per day on weekends as well.

PAKISTAN has signed agreement to use Shuttle to launch its first satellite; a Pakistani astronaut will also go along for ride.

INDIA says it will accelerate program to develop its own launch vehicles to place satellites into Clarke orbit.

CNN has asked FCC for permission to build 5 meter terminal for dedicated reception from Russian bird at 14 west. FCC has not acted on application, handed it to Department of State for comment.

M/A-COM has sold more than 1050 'Personal Earth Stations,' new 4 or 6 foot business communication systems for Ku band interconnecting. First 300 are to Southland Corporation; next 750 to Wal-Mart Stores.

CANADA had problems with D2 satellite when satellite antennas changed direction away from earth. Controllers got bird 'back' but only after expending more than five months of station keeping fuel in complicated retrieval operation. D2 bird is scheduled for 1986 replacement of present Anik-B bird and presently sits in orbit waiting its turn to be used.

ADDITIONAL FCC approvals for 'transborder' satellite service to areas outside of USA by DOMSAT birds; approved was RCA service to Canada, Western Union service to Caribbean, Equatorial to Mexico via US DOMSATs and new Mexican domestic bird, Western Union for Costa Rica, Belize, Haiti, Dominican Republic, Mexico and Haiti and RCA for NBC delivery into Caribbean.

OAK Communications closed out 'videoconferencing business' unit after it failed to turn profitable. Videonet customers are shifting to other services principally Satellease of Chicago.

SBS now offering 1.2 and 2.4 meter dish Ku band systems for videoconferencing applications. System will use analog, not digital video techniques, to hold system costs down.

ECS3, third Ku band video and data satellite for Europe, now scheduled for September launch on Ariane.

MUSICbox, European equivalent of MTV, got two-day experimental showing on Belgium cable system as a 'test.' Belgium cable operators, now largely equipped for satellite feeds of RAI and other services, slowly 'expanding' to add additional satellite services as 'test' of Belgium 'law.'

LATEST FCC study of C and Ku band activity shows no real change from last quarterly report; Ku band channels are about 50% utilized while C band channels are around 58% utilized.

SCIENTIFIC-Atlanta rebound from economic problems gets better each quarter; latest report shows 8% revenue rise and 82% net rise.

ARGENTINA has applied for orbit slots for a pair of domestic satellites; 80 and 85 west. Regional and national TV distribution is in the planned package but C or Ku band decision not yet made.

LEASAT bird, built by Hughes for U.S. military, caught in low earth orbit after failure in April to properly deploy, may be target for spacewalk during August Shuttle flight. Plans to get the bird moving again are being formulated, attempting to activate it in space rather than bringing it back for repair.

COOP'S COMMENTS/continued from page 5

anyone in the TVRO 'selling game' who does. Like I said, we have plenty of good salesmen but I'm not so sure we have ever developed any good marketing people.

"**Advertising, on local radio or in local newspapers,** can be a total waste of time and expenditure if the person creating the marketing program does not understand the market he is trying to reach. Words, pictures . . . they don't bring people into a store to buy. That's why we see so many **price-oriented advertisements** in papers and on television. The first thing a **salesman** does when sales get slow is cut the price. That immediately tells the world that somehow the product had been overpriced to begin with. People buy **because of perceived value,** not because of price. If people perceive the value to be $3,000, they won't hesitate to pay the price. If they perceive the value to be $2,000 and you are asking $3,000, cutting the price to $2,500 won't make a big difference. The only people you will catch this way are those in the minority who thought it was really worth $3,000 all along.

"**Cable learned this the hard way.** Cable firms often get stuck at some 'penetration level' with a pay service such as HBO at say $9.95 a month retail. They don't cut the price to reach a new market segment; they repackage HBO with two or three other services and offer it as a 'tier' for $19.95. Now they have one premium such as HBO, another premium such as Disney and they throw in a pair of dime-a-month services such as WTBS and ESPN. The public perceives that they can get HBO **alone** for $9.95 or **four new,** special channels for $19.95. That usually results in an upgrading to the $19.95 'tier' by a significant portion of the people paying $9.95 a month for HBO alone, plus it also usually makes them pick up 5 to 20% growth in new pay-tier subscribers in the process. **Perception of value** . . . first you have to understand what individual groups of people want for their entertainment dollar and then you have to package what you have to offer so they

perceive that at the price you are asking, there is 'value' to them. **I don't see that happening yet in TVRO at the retail level."**

Jeff is quite convinced that our industry is at a plateau; that the 1,000,000 homes we now serve were 'easy sales' and that for the next million to happen, there has to be some creative marketing.

"This may be a bad year for TVRO because here we are virtually half way through the year and people are still harboring the illusion that you create more sales by simply lowering the price. Someday, far down the road, that will happen on its own. But before you get there, you still have several million sales out there which simply need to have their 'hot buttons' pushed."

I talked with Jeff about how a dealer can compete with those who simply lower the price. He was familiar with our problem with 'part-time TVRO dealers' operating out of their garage.

"It is a challenge because until these price cutters come on the scene, the dealer has not really had to sell **himself;** he has merely been selling a similar package as the price cutter, and he ends up frustrated because he cannot or will not match the low ball price. I think the first thing I would do is 'go to school.' If I were a full-time dealer, I'd spend every spare minute reading every piece of literature I could get my hands on. I'd know the satellite belt backwards and forwards and I'd know every service up there by operations schedule, by transponder and by programming. **I'd fight the urge** to be an **'equipment freak'** and I'd develop my sales skills around selling the one thing that brought people into the store in the first place; **the promise of more channels, better reception, and an unlimited variety of programming.** Early in every sales contact, I'd make it a point to **ask questions,** to find out just what it is in life that turns a person on. If it turned out to be hunting and fishing, I'd have a well developed instant recall of every hunting and fishing program on any satellite channel available.

"A person buys first because of perceived value and second because of price. The first salesman that tapped my 'hot button' for perceived value would probably get my check even if I later found somebody else who sold for less but who also knew less. **I'd buy from the person or firm that instilled the most confidence in my mind** about this 'high tech purchase' and a guy who could spout out a dozen listings of hunting and fishing shows, if that was what turned me on, would get my money. **Why?** Simply because I would feel 'comfortable' talking with that person, like they shared something in common with me, even if I knew down deep that the salesman was really a walking encyclopedia of **everything** on satellite.

"Remember that satellite systems are a little scary; they can intimidate the unwashed. The sales approach that identifies my interests and which makes me comfortable with the equipment's operation is the right one to sell me. If I was hearing about vertical and horizontal polarization 60 seconds after I walked into a sales rocm, I think I'd get frightened and beat it out of there in a hurry. People who buy 'gadgets' have pretty much already bought. The next 'wave' are people who are buying **the service** and to reach them, you have to understand what it was that sent them into your store in the first place. **A good salesman asks questions up front,** to identify the interest of the buyer. He does this to structure his presentation. If I walked into a store to look at one of these things and the guy immediately launched into a dissertation of how high the satellites were and how fast his dish moves from one end of the belt to the other, I'd be frightened by all of that technology. On the other hand, if the guy started talking fishing and fishing was a favorite topic of mine, **I'd feel pretty good about being there."**

The cable industry didn't reach its present nearly-50% penetration of American homes because they sat back and waited for people to come in the door. They developed clever marketing programs based upon identifying the 'hot buttons' of the hold-outs; the people who had resisted the initial urge to 'get cable.' People like Jeff Treeman can teach us a great deal about reaching our second and third million homes. Perhaps some of our industry's future convention seminar sessions should focus on this yet-to-learn lesson in 'salesmanship.' We have been selling to ourselves, and each other, for the past five years. The 'pyramid' is now built and the time may well be at hand to branch out and start selling the 'real customers' out there.

CHAPTER 11 And Other Spring Remedies

Retail business, I am told, is running 15 to 25% behind a year ago in many sections of the country. That's not a good sign. I've heard comments such as "The telephone didn't ring with an order for three

AVCOM

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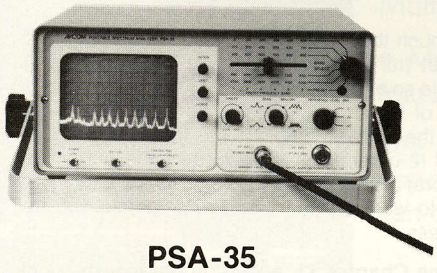
Quality, Reliability & Ease of Operation
For Your Specific Needs

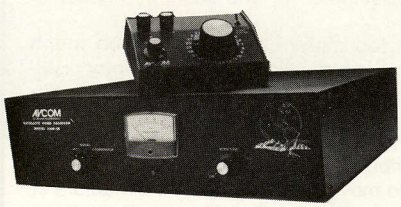
AVCOM is known for its high standard of performance, reliability and value in a full range of communications equipment to meet your every need. The quality and workmanship that has gone into the design and production of **AVCOM's** full line of Satellite Receivers is also a "standard feature" of **AVCOM's** new line of Spectrum Analyzers, featuring the Portable PSA-35.

NEW!
ANOTHER INDUSTRY FIRST FROM AVCOM!



PSA-35
SPECTRUM ANALYZER

AVCOM's PSA-35 Portable Spectrum Analyzer offers frequency coverages of 10 to 1500 MHz and 3.7 to 4.2 GHz for checking signal strength, inband attenuations, terrestrial interference and filter alignment, faulty connectors and LNA's, feedhorn isolation, and cable loss at all frequencies used in the TVRO industry, including 12 GHz downconverters.



COM-3R

AVCOM's COM-3(R) Series of reliable Satellite Receivers features 24-channel detented tuning, APS-24 (automatic polarity switching), crystal controlled modulator, unclamped video output for decoders, tunable audio (4 to 8 MHz) with wide and narrow IF bandwidth, sensitive signal strength meter, excellent threshold sensitivity, scan-tune circuitry, and internal DC power block. The COM-3 features a convenient remote control unit for ease of operation. The COM-3(R) Series is among the best performing Satellite Receivers available for weak signals and excellent video reception.

SPECIAL HALF-TRANSPONDER RECEIVERS FOR INTERNATIONAL-TYPE TRANSMISSIONS

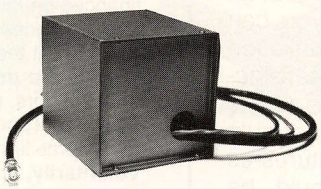
AVCOM's COM-3, COM -3R and COM-60 Series Receivers can be ordered with options to receive half-transponder international-type signals. The THRESHOLD PEAKING option greatly enhances threshold performance on weak half-transponder signals. The DUAL IF electronically-switched full and half-transponder filter option allows reception of international-type signals as well as standard domestic satellites.

BLOCK DOWNCONVERTER SYSTEM

For Cost-Effective Multi-Channel Installations

COM-66T

AVCOM's COM-60 Series of Satellite Receivers features commericial quality, double conversion, high stability, compatibility with SA's 6650 receivers, rack mounting, flexible downconverter for use with any degree or brand of LNA, scan tune, signal strength meter, tunable audio, and horizontal/vertical control output. No isolators are needed for these block downconversion systems, and numerous options are available. The COM-65T is equipped with a unique group card channel selector.



AVCOM's BDC-60 BLOCK DOWNCONVERTER is used with the COM-65T and COM-66T Satellite Receivers to convert the 3.7 to 4.2 GHz signal from any low noise amplifier to a 270 to 770 MHz block of frequencies. The BDC-60 has a built-in DC power block and can be used to replace more expensive LNC's.

COM-2A

AVCOM's COM-2A and COM-2B Satellite Receivers offer attractive styling and convenience with the quality **AVCOM** is known for. Tunable Audio with wide and narrow IF, scan tune, signal strength meter, and provision for internal crystal controlled modulator are standard features. The COM-2A receiver features a comprehensive remote control unit. Numerous options are available for both receivers.

SCPC-100

AVCOM's SCPC-100 offers a versatile approach for receiving specific frequencies of SINGLE CHANNEL PER CARRIER transmissions. The SCPC-100 solves the problem of receiving audio transmitted separately from video. Radio stations can use the SCPC-100 to receive program feeds. Downconverter may be remoted at antenna or installed in the receiver mainframe. The SCPC-100 is used with an FM tuner.

Check with us. Different needs require different receivers. So let us know what you need, then we can recommend the **AVCOM** Receiver that's best for you. **AVCOM** will make custom modifications on equipment you order to give you maximum performance and to allow for special applications. **AVCOM** also carries a complete line of TVRO accessories and satellite receiving compontents. To simplify satellite installations and other TVRO test situations, **AVCOM** manufactures a line of Spectrum Analyzers, featuring the PSA-35. For more information on any of **AVCOM's** reliable TVRO equipment, write: **AVCOM**, 500 Southlake Blvd., Richmond, VA 23236. Or call **(804) 794-2500**. To place an order, call toll-free: **1-800-446-2500**.

days" from a well known OEM. They were all business days at that. This is not a gloom and doom report but the general state of **cash flow** within the industry is NOT good and no glowing editorials will change that fact.

I've had several calls from people to tell me that such and such a supplier has 'filed for Chapter 11.' I'm not sure most people understand what **Chapter 11** really is and before you start hearing this phrase weekly (or daily) it might be well if you did understand it.

Chapter 11 is 'voluntary re-organization.' That means a company, such as LOCOM recently, can no longer pay its debt schedule (such as its suppliers) on a timely basis. A company that gets behind with its bills knows if it doesn't do something 'positive,' one or more suppliers is going to get nervous and institute legal proceedings to collect its money. A company that is short of operating cash, faced with a 'demand payment' from a supplier, then has to face the unpleasantness of '**involuntary** bankruptcy.' That is, it has a bill or bills to pay, it does not have the money to pay the bills, and to avoid personal liability of the management and stockholders, the company goes to court and requests the 'protection of the court' while the financial mess is untangled.

Chapter 11 is very much the same except that the firm involved initiates such as request (for 'voluntary financial re-organization') **prior to** being forced to do so by a nervous supplier. Chapter 11 does not mean a firm is out of business or closing its doors; quite the opposite, it has 'caught' the problem before it was forced to close its doors. Under Chapter 11 re-organization, a firm seeks the 'protection of the court' (from creditors) while the company and a court appointed person or firm attempt to work out the financial problems and reschedule the indebtedness.

We are having some Chapter 11 'events' in our industry right now. And 'voluntary' is far better than 'involuntary.' Now, why is all of this happening?

If you are reading this from the perspective of being in the electronics manufacturing business and you have some concept that you would like to manufacture TVRO antennas, or LNAs or receivers or feedhorns or actuators because you think TVRO is a great market to be in, I have a piece of advice for you. **Wait.**

Wait at least a year. Go away and build something else for awhile. **We don't need anymore people building anything; right now.** There is no shortage of any equipment; no equipment is over or unfairly priced. There is no missing technology that you can bring to us.

What we do have is an overabundance of everything. Except sales and cash. When a major receiver OEM 'dumps' 8,500 of his TVRO receivers to a major distributor for $50 each, as happened recently, times are not good.

We started the year with **too many** OEMs building **too much** product. This merchandise was in turn being sold to **too many** distributors who were cutting prices **too low** to allow themselves to maintain a decent profit. When sales slowed down and the OEM output of equipment kept up its maddening pace, the pipelines filled and then in some cases burst open. Distributors caught with 'factored inventory' financed on their floors had to move it just to pay off their factors or lenders. Prices tumbled further and whatever profit as may have been available at the start of the year eroded to no profit quickly.

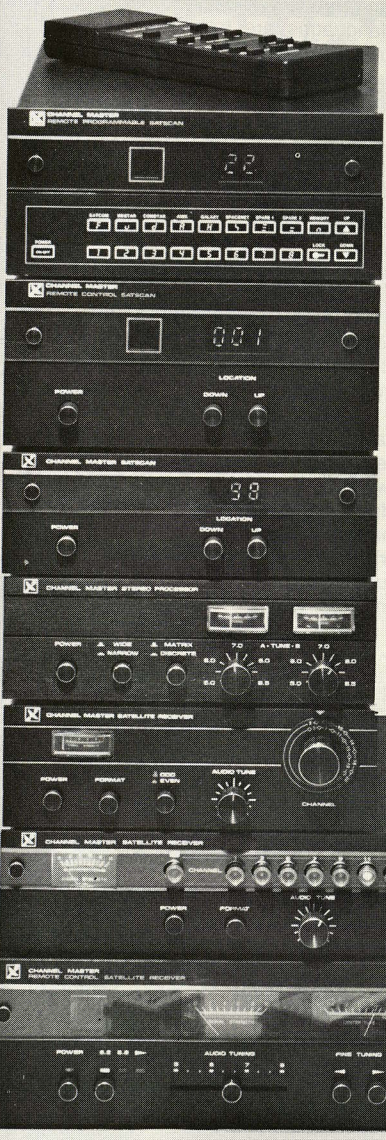
With no profit, people began to stretch their payment terms to their vendors, where they could. In less than sixty days, vendors of component parts, nervous about what was happening, were threatening to force firms into **in**voluntary bankruptcy. The sharper ones did it **voluntarily,** or are considering it today.

No, the industry is not dying nor dead **but it is hurting** because there is too much equipment and too low prices. We don't need any new receiver brands, any new antennas, any new LNAs or LNBs or LN-anything. What we do need is for the pipelines to recede in level, for inventories to dwindle, and for people who are producing product to **voluntarily cut back** on their production until the demand catches up with the supply.

The unfortunate part is that the worst is still probably to come; entire new product 'families' are headed for North American shores from the Far East, and as the boat loads begin to arrive during June and July, the oversupply of equipment is apt to grow even worse before it has the benefit of the fall selling season to level back out

Master Performers

A choice lineup from the TVRO system experts.



Choice means satisfaction—and Channel Master's line of high-performance satellite system components offer MORE:

- MORE STYLES of antennas, including new 6′ and 10′ matte black perforated aluminum dishes.
- MORE FEATURES on receivers, such as our Model 6134 with infrared remote which also controls the Model 6152 Satscan™ antenna drive and Model 6124 Block Downconverter.
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See our Master Performers at the Summer CES, Booth No. 4000, and the Space/STTI show, Booth 1817 and find out what TOTAL SYSTEM CHOICES can do for your business.

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CSD 65

again.

It would be far better to find ourselves in a situation of equipment shortages this fall than to continue the present over-supply situation. Unless and until we get some profits back into the business, TVRO systems will continue to be 'whored' on street corners all over North America. Every level within TVRO, from OEM to retailer, needs to be conscious of what happens (and is happening) when the supply exceeds the demand by 150 to 200% and **all profits** at **all levels** disappear. Self-control, restraint, begins in our case at the OEM level. A twenty-five percent reduction in output for the next 90 days would be a significant step towards recovery of profit in the entire marketplace. And if we can't do that on an individual OEM by OEM basis **voluntarily,** the next step is totally **INvoluntary.**

TURNER'S European Launch

Ted Turner's CNN is going to Europe; the official start date is now September 15th although that may vary some before the service really begins. There is more to this than simply ordering up new transponder time to interconnect to European viewers.

CNN problems in Europe are many, starting with the reluctance of the individual government regulatory agencies to even allow CNN into their countries. In Europe, most of the telecommunications world is controlled by something known as 'the PTT'. A 'PTT' is a quasi-goverment monopoly usually funded directly by the government and holding the exclusive right to operate **all** of the nation's communication systems. That often extends to the direct or indirect control of the broadcasting systems including national television and radio networks. A PTT is basically bureaucratic, and very nationalistic. Anything that is created, built, and 'launched' from within their own country is 'good', provided the PTT owns and operates or controls. Anything coming 'inside' from outside is basically 'bad' because the PTT has had no part in operating, controlling nor owning. **CNN falls into the latter category.**

Additionally, CNN is 'American'. It may be difficult for you to grasp sitting in downtown Wichita reading this, but American television is feared in most parts of the world. We are 'too open', 'too competitive' and 'too explosive' for our own good, we are told. Our block buster program exports such as **Dallas** and **Dynasty,** ranking high throughout Europe in the many dubbed languages, are 'tolerated' because they satisfy some economic or cultural 'need' in the countries where they appear. And they are widely perceived as 'fantasy' with only a handful of Europeans really believing that either program mirrors **real American life** styles. In fact, they are accepted as 'American exaggeration' and tolerated because they tend to make America look less than flattering in many respects.

News is a very special topic. News is now, it is instant, and it is closely followed and widely believed in Europe. European television systems vary from the relatively wide-open United Kingdom news programs to the carefully manipulated news reports on French television, for example. The news departments of national networks, directly or indirectly controlled by the PTTs, march to a drum beat created within the bureaucracy of each country. News tends to be 'laid back', 'soft', and not hard hitting. It is also often censored, perhaps not overtly but more by careful management of what airs and does not air. But most of all, news is 'scheduled' in Europe for a particular time and some have suggested to me that even the outbreak of World War Three would probably not cause the news departments to change their schedule or to post a 'news bulletin' in most countries. Most European news departments refuse to be rushed; the news **will air when it is scheduled** to air, and not a moment sooner.

Turner plays by different rules. The 24 hour service of CNN moves with great speed and it updates itself every hour or so. You don't have to wait until the next night at 10PM to learn that 46 rather than 26 people have died in an airplane crash.

THE ROAD TO SUCCESS IS MEASURED BY SUPERIOR QUALITY

For any business the road to success is long and difficult. But measured by the quality of Superior™ aluminum mesh antennas, the road is shortened considerably.

Superior™ high performance antennas are scientifically designed for low wind resistance, light weight and stability in the field. And because we want our Superior™ quality to shorten your road to success, the manufacturing process of our five and one-half, eight, ten, twelve, sixteen and twenty-five foot antennas are monitored by a strict quality control program.

U.P. Superior Satellite Dish Manufacturing. Our Superior™ quality shortens your road to success.

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Buddy's Electronics
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Herman Electronics
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National Micro Dynamics
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Stellarview Satellite
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Vidcom Satellite
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Lycon Farm Implement
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T & T Satellite
Glenns Falls, NY
518-792-4913

Satellite Antenna Systems
Houghton Lake, MI
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C-Z Labs
Garnerville, NY
800-423-2322

Ultra Satellite Systems
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Telsat East
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Turner's crew has been in Europe, rounding up the ground support for CNN's launch there, for several months. They are having problems. The first level of problem is with the PTTs. The fact that CNN will be available into Europe on Ku band, and capable of being picked up with a 3 foot dish, is hardly enough. If the same rules applied in Europe as in America, the only challenge facing the Turner team would be to figure out how to get people to use the service and pay for it. Unfortunately, they have the reverse problem.

The first market target is the lodging industry; hotels, motels such as they may exist, airport lounges and other spots where people (Americans and others) pass through. CNN hopes to be able to collect $.30 per lodging room per night for delivery of CNN into the hotel's SMATV system. Alas, there are problems.

First of all, to bring CNN into Switzerland, or Germany (et al) will require PTT approval. This 'foreign' and 'American' program service cannot be received and distributed in any country in Europe **unless** the respective PTTs grant their sanctions. If the PTTs are closely aligned with the local (national) broadcasting service, there is a cross current flowing between the national TV service and the PTT. The TV folks are not anxious to have CNN popping up in thousands of hotel rooms today, or thousands of cabled homes tomorrow simply because they worry that CNN's **'instant-news 24 hour per-day'** format will make life more difficult for them. Today, **they control** the news; not so much what is said, but **when it is said** and how it is said. If there are government policies threatened, a careful 'scheduling' of a news item or a careful deletion here or there can help official government policies survive. Turner's CNN respects none of this and CNN reports widely available to millions of European viewers will force numerous policy changes that will ripple through not only the PTT and broadcasting bureaucracies but through national governments as well. No, you don't have that problem in Wichita. And aren't you glad!

The second problem is more mechanical than political, but it becomes political in a hurry. Let's say Turner has the interest of a 500 room hotel in Berne, Switzerland. If CNN gets the order, they can anticipate 500 x $.30 or $150 a day from the hotel; $4,500 in a month. With monthly transponder costs, getting into Europe, running around $250,000 and up, it will take a pretty fair number of 500 room hotels to pay the bill.

The hotel has an MATV system but no satellite signals available. OK, you find someone in Switzerland who can provide and install a proper Ku band terminal and then interface the output of the terminal, through a modulator, to the hotel's MATV system; instant **S**matv system.

Maybe not. Satellite TV is so new in Europe that there is no trained cadre of personnel nor firms available to do such work. So Turner has to look further than Berne, probably further than Switzerland itself to locate a firm with that kind of expertise. Maybe he has to go all the way to Sweden to find someone that is qualified. Now for phase two of the second problem.

The PTT says that installing satellite antenna systems is a 'special' kind of skill; they want **their own technicians** to do the work. Turner thinks this is OK until he finds out that they want the equivalent of one year's income from the hotel to install the terminal. And CNN balks at the offer. The PTT smiles and says "obtaining permits for the Swedish firm to work here, inside of Switzerland, may take six months; maybe even a year." The message is plain; pay or wait to play.

Now multiply this example (which is only an example; Switzerland is not one of Turner's BIG problems at the moment) by a dozen countries each with its own PTT, its own rules, its own bureaucracy, and its own national television system.

One has to believe that Turner's people were at least aware of these problems before they announced that 'CNN is coming to Europe'. Turner himself is a frequent traveler to Europe, and as bright as Ted is, he had to know that just because they spoke English in Ireland was no guarantee that they understood everything he said, nor that what he wanted to do would be allowed. The problems become greater where English is not the primary language of course, but the targeted hotel market where service is scheduled to begin has no real language problem since travelers tend to be well educated, upbeat people who at least can follow (if not converse in) English.

But speaking and understanding English is not the real problem that follows all of the Turner plans throughout Europe. The real

problem is that Turner and CNN represent a bold, **American brashness** to speak directly about every problem without trying to hide the true meaning behind carefully selected words. Turner's directness in Europe is scaring many European leaders and as the CNN and Turner Broadcasting crew is learning, the 'CNN style' may be a millstone around their necks as they battle their way through PTT bureaucracy after bureaucracy trying to gain a toehold in Europe for CNN.

On the surface, the launch of CNN into Europe seems like just a simple economic problem; how do you break even, or make money, sending American news-television to Europe? It may turn out to be far more than that before it is all over. And how well it goes, during the next year, may ultimately determine whether any additional American programmers 'follow Ted' into Europe.

HBO's Choice

We reported in the May 15th issue of **CSD/2** that HBO had finally decided how they would sell their premium service(s), themselves and Cinemax, to the home TVRO industry. In a release issued May 2nd, they explained that they had dropped their plans to 'bundle' a selection of programming sources in favor of 'going it alone'. They also explained that the latest entrant in the bundling game was M/A-Com, which it turns out is proposing to create a 'master uplink' someplace in the vicinity of New York City from which they would encrypt and transmit the programming of anyone who wanted to sign on board as a 'user' of the Linkabit system.

HBO, meanwhile, **will sell its services for $12.95 per month** (each, for HBO and Cinemax) or $19.95 for the pair. They will do this first through their cable TV affiliates, where they have cable affiliates, and next through a direct marketing program ('Telemarketing') which will probably involve massive advertising in publications such as **Satellite TV Week, TV Guide,** and **Orbit.** TVRO owners not located within the selling territory of a cable TV affiliate of HBO will telephone an 800 number and order first their descrambler and then their service. The descrambler order will be shuttled off to the M/A-Com created distribution stream while the 'software' order for program service will be handled in house by HBO. It is likely that they will accept major credit cards as a form of payment and that there will be some scheme to allow payment to be made monthly, or in larger increments.

The hardware will be distributed through M/A-Com outlets; cable TV affiliates of HBO can buy the VC2000E outboard package (see page 26 here) and resell the units, or least/rent since they get to keep the investment credits that way and play games with their annual income tax returns. The descrambler hardware will also be distributed through M/A-Com TVRO distributors and the story is that you as a dealer can buy the hardware through the distributor and then resell it, **if you wish,** to your TVRO customer.

If M/A-Com sticks to their $325 announced wholesale price and the VC2000E has to gravitate from M/A-Com (at $325) **through** a distributor **and then to you** the retailer with everyone making a profit along the way, AND, if HBO and M/A-Com make it universally known that the retail price is supposed to be $395, there is a definite shortage of 'margins' here for the retailer to play with. In effect, you may have to end up giving the descrambler away at cost just to make a TVRO sale or to keep an existing customer happy. You might do just as well to give the customer the HBO telephone number and let the customer figure it out for him or herself.

Meanwhile the cable company is able to price HBO and Cinemax at whatever they wish. They will be paying the same sort of $4 per subscriber rate for home customers as they typically pay for cable subscribers. With HBO establishing a **national rate** of $12.95 for each service, it is unlikely that many cable firms will opt to sell it for anything lower than this. And the fact that $12.95 is some 25% more than most cable homes pay for the service, while home TVRO owners have spent large sums for their equipment and home cable viewers spend nothing for satellite equipment, seems like a raw deal to us.

Still, HBO has finally said that they WILL offer their service to home TVRO and they have finally stated a price and a method of obtaining the service. **The most important part** of all of this is that Ed Horowitz, the HBO whiz kid that devasted Canada last March with his **'The-Sky-Is-Going-To-Go-Dark'** routine, will have to find something else to say to attract attention in public. In short, HBO is not going to support a 'darkening skies' policy and the cable guys can quit running

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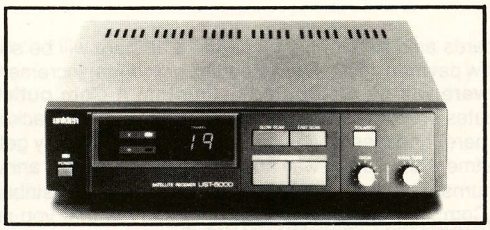
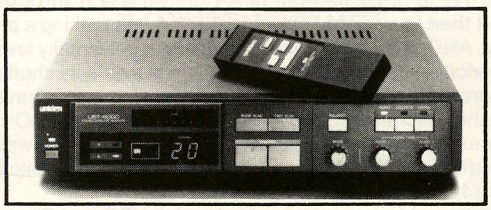
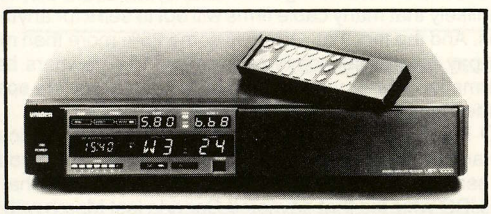


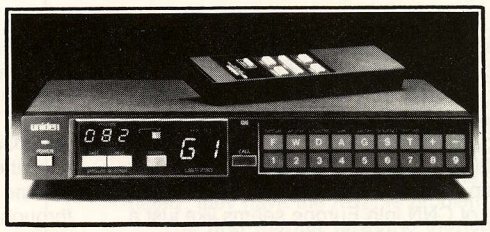
UST 5000 Block receiver offers LED channel display, automatic polarity control, slow and fast scan.



UST 6000 Block receiver features expanded audio format and fine tuning skew adjustments.

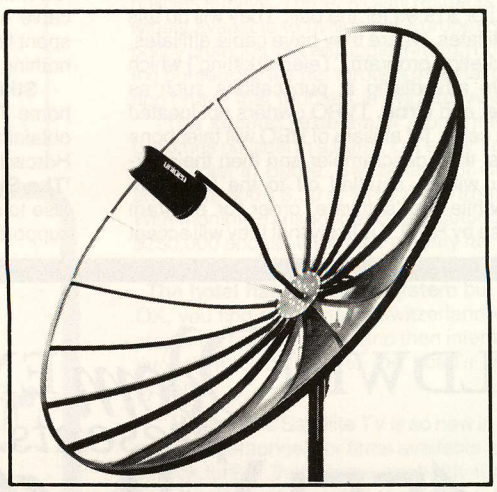


UST 7000 Block receiver features IR remote built-in programmable antenna control accommodating up to 81 satellite positions in memory.



UST 730 Antenna Positioner features built-in programmable antenna control and Opto-Interrupt circutry.

UST 710 Antenna positioner offers compact styling, manual east west control and 3 digit LED readout.



UST 110 Aluminum Mesh Antenna is designed for maximum flexibility and maintenance, easy to install and weather resistant.

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those big advertisements in newspapers warning people (in a 'public spirited' way of course) that home TVROs are a foolish investment.

Retail sales of TVROs in all but the northeast were slow through April and into May. The slowdown in buying may have somehow been connected to HBO scare stories and guys like Horowitz. Or it may have simply been the late coming of spring. In any event, now that HBO is finally on record as being ready and able to do business with home TVRO, **that chapter** in our life is past. We may not like **their price,** we may not like **the method** they have created to sell to home TVRO users, we may not like being stuck with a **single source** for the descramblers. We also don't have to actively sell on their behalf to our customers nor do we have to offer the descramblers to our customers. We can if we wish, but as long as Showtime and others are not scrambling, **where is it in our best interests** to do more than smile and say politely 'Oh yes, you **can** order HBO **if you wish . . .'?**

Only one piece of unfinished business remains with HBO; **when** will they scramble? The HBO release told us they will scramble when they are convinced that a 'suitable number of descramblers are in the pipeline or in place'. That puts the ball back in the M/A-Com court since it now becomes M/A-Com's job to get their Puerto Rico plant up and running cranking out the VC2000E units. Nobody at HBO is willing to say whether 10,000 or 100,000 VC2000Es 'in the pipeline' are reasonable numbers to expect before the scrambling begins. At the time of the HBO announcement, followed by a companion announcement from M/A-Com and a second HBO announcement to its cable and MDS affiliates, nobody anyplace was willing to venture a guess as to when M/A-Com might have VC2000Es pouring out of Puerto Rico or when full-time HBO and Cinemax scrambling would begin. In the interim, intermittent testing of both services continues on a routine and scheduled basis and it is happening often enough that most of you have caught at least one or more examples of the encryption at work. **You should expect** HBO (and Cinemax) to keep that schedule up on a regular basis because the presence of scrambling, even if only for 20 minutes a day, helps to re-enforce their total commitment to scramble full-time; soon. And it serves as a very visual reminder to TVRO users that one day, perhaps soon, scrambling **will** be here.

Ku Tu?

With the recent failure of USCI in the Ku band using a leased Canadian satellite, this is probably not a very good time to be optimistic about the use of Ku to deliver television programming to home terminals. On the other hand . . .

Let's see who is using Ku these days.

According to the most recent 'quarterly' FCC 'survey' of which transponders on what satellites are being used, we have 52 total (US) Ku band transponders available, in orbit; 26 of these are 'inactive.' That nets us 50% in use, 50% not in use. And of the 26 in use, 6 were found to have been television operational. All six of those are on SBS3 which is located at **85 west.** The TV transmissions, there, are:

TR1/11725 MHz — Occasional video
TR2/11774 MHz — Videostar occasional feeds
TR3/11823 MHz — NBC Pacific time zone feed (audio 6.2)
TR4/11872 MHz — Occasional video
TR5/11921 MHz — NBC Burbank to New York link (audio 6.2)
TR6/11970 MHz — NBC Central time zone feed (audio 6.2)
TR7/12019 MHz — Hubbard News Service
TR8/12068 MHz — Private Satellite Network (usually encrypted teleconferences)
TR9/12117 MHz — **NBC** (6.2 and 6.8)
TR10/12166 MHz — Occasional video

Yes, that adds up to more than 6 but remember that the FCC does its survey very quickly and if after a couple of hours of 'checking' on a given satellite they don't find activity, they mark it up as 'inactive.' The NBC feeds are very busy most of the time; the rest come and go.

ANIK C2, located at **105 west** as an interim location to serve its USCI customer, is of course now dead of USCI service and plans are

to move it back 'deeper' in the Canadian portion of the orbit belt. **Anik C3,** located at **117.5 west,** is still very active with Ku band signals. The SBS3 service signals are all uniformly horizontally polarized while Anik C3 mixes vertical and horizontal services on the same bird. It also uses spot beams which illuminate only special segments of Canada (with some spillover into **close-by** regions in the USA). If you are near the Canadian border areas, basically transponders T3 to T12 are for the western portion of Canada and they are allocated between 11717 MHz and 12048 MHz (or the lower portion of the band) while transponders T17 to T32 are for the eastern portion of Canada and they are located between 11730 MHz and 12183 MHz. If that seems nearly redundant, try this as a memory aid; the **western** transponders are **vertical** polarization and the **eastern** are **horizontal.** There are 5 for the west and 8 for the east apparently still in operation.

Now, what does all of this tell us?

First of all, there is **some** Ku band activity. Not much to be sure, but some. Of everything that is 'up there' now, the most 'appealing' part of it would be the SBS3 service for the USA. This is a CONUS beam coverage pattern which falls off towards the edges and reportedly 3 foot dishes produce video almost anywhere although the extreme corners (South Florida, Maine, et al) may require bigger antennas.

This will be the first fall when NBC is 'all Ku' (their F1R service being an exception to that statement). NBC says they will ONLY USE the Ku band services of SBS3 this fall to bicycle football games about. That means that those who want to zero in on the NBC AFL football games will have to invest in a Ku band terminal this year. The only 'game' likely to be on C band will be the F1R feed of the **primary** network service, assuming that feed is kept active; and those picked up by the Armed Forces Radio and Television Service (AFRTS) for shipment overseas on the two C band AFRTS transponders (F1R, TR20 and F2R TR20).

A C band terminal antenna system **can be** retrofitted with a Ku band feed. Right now you have a couple of choices; you can hang a Ku band feed along side a C band feed, accept a gain reduction and run separate LNBs for each band through a switch to the input of a block IF receiver. Or, you can manually switch out one feed for another (or, install a separate antenna for Ku). New dual-band feeds, from Chaparral and Luxor to mention a couple, are on the immediate horizon. With these, you'll be able to receive both bands from a 'centered feed' and each band will have its own LNB and output line to the C/Ku switch that feeds into the block downconversion receiver. I expect both **Chaparral** and **Luxor** to have their two band feeds available by the Nashville show; just in time for the fall football season on NBC.

Some people have been testing C band antennas with Ku band electronics. I watched a **Paraclipse** 12 foot test and we found that the antenna had **25%** efficiency at Ku (versus perhaps 62-65% efficiency at C). But a 12 foot surface, 25% efficient at Ku, is the equivalent to a 6 foot surface 50% efficient at Ku so there is still plenty of usable gain there. A new ten foot super-expanded-mesh from **ADM** did better appearing to be at least **40%** efficient at Ku. I'm sure others will be testing their non-solid C band antennas and shortly we will begin to see numbers appearing in advertisements advising just what we can expect at Ku from many of the popular C band antennas.

However, motor drives and tracking **is a problem at Ku.** You have to remember that the Ku band signals are 1/3rd the length as the C band signals; just little fellas. That means that for equivalent performance at Ku, everything associated with a system has to be 300% as accurate as at C band. If a tracking system turns out to be acceptable when it is ±0.30 inch at C band, the same tracking system at Ku has to be ±0.10 inch accurate. This also affects the motorized portion of the system. Can you stop it closely enough, often enough, to come to rest on a Ku band bird? Those I have tried could not stop dead-on a Ku band bird without some playing with the mount itself and then the best I could do was dead-on a single Ku bird and off on the others. If we are going to have motorized drives and controllers that work on Ku, there is still plenty of work to be done. The drives, to work at Ku:

1) Must start quicker,
2) Stop quicker,
3) Come to a rest more often,
4) Have about 1/3rd the 'slop' or play they now have.

Yes, there is an engineering challenge here and the market for such a drive would also include Europe since there will soon be three TV program loaded birds for Europe operating on Ku band.

Ahead we have a pair of RCA birds scheduled for launch over the next 12 months. These are RCA's Ku band versions of F5; the latest in solid state technology, 40 watts per transponder (a 3 dB improvement over what is up there now) and RCA is already selling transponder space on Ku1 and Ku2 like it originally sold transponder space on the first F1 and F2 birds. Very aggressively.

Ku2 will go up first, perhaps in December, and four or five of its transponders will be put into service by a television station program consortium. These are likely to be quite video-busy transponders. And then there is **Holiday Inn** which has a 'hold' on four Ku band transponders so they can deliver the next generation of 'in-room' service to Holiday Inns from coast to coast. HI was the motel/hotel pioneer at C band and their management now feels that C band is old hat and Ku is the place to be. They plan an adult channel, a general movie channel, a sports channel and a news channel. The motels have learned a great deal about what motel patrons want in the way of in-room TV by the way. Would you believe that when a motel offers **HBO** and the **Playboy Channel** on a 'pay-per-evening-view' basis that Playboy outsells HBO 5 to 1? Believe.

We will be seeing more and more claims for Ku band compatibility in the months ahead. Virtually any receiver that uses the 950-1450 block IF range is basically compatible for a Ku band head (LNB) already. The IF bandwidth is one unknown at the moment since most Ku band birds use 54 MHz bandwidth and most C band birds 36 MHz. But the trend at Ku, at least in the planning stages, is to take a 54 MHz wide transponder and divide it in half for a pair of 27 MHz wide channels. This fits our IF formats at C band quite well so ultimately the IF bandwidth problem may turn out to be a non-problem. And I suspect that some of the more advanced dealers will be offering dual band systems this fall; certainly Luxor will be pushing hard in that direction with its equipment line-up and others are sure to follow if they see Luxor gaining a competitive edge here. With a few slow retail months ahead, this might be a good time to invest in a Ku band head and feed and then start to do some experimentation on your own. Getting familiar with **an entirely new set of installation problems** before you start offering the stuff for sale would be a smart move.

MEXICO Ku?

When Mexico announced its domestic Ku system plans several years ago, they said that their state-of-the-art 1985 bird(s) would be dual band with both C and Ku on board. They also explained that the Ku portion would be utilized for telephone and data traffic while the C band portion would be used for video, radio station networking, and so on.

Early this year the Mexican planners flopped their plans; Ku would be for video and teleconferencing and radio station networking and C would be for telephone and other narrow band point to point applications. That change in plans threw a curveball at those waiting in line to bat in the Mexican satellite league.

Mexico's bird is due to launch about as you read this. It will be positioned at the far end of the Canadian belt segment and when it is on station, it should be as strong in regions along the Gulf Coast as any satellite has ever been; at C **and** Ku.

The Mexican television networks plan to use the Ku channels to link their flagship stations in Mexico City to every outlying region in Mexico. That means that up to a half dozen big city, high quality Spanish language television programs virtually 24 hours per day anyplace in Mexico. On the ground, they'll receive the signals and then rebroadcast them through local cable systems or through local low and medium power VHF transmitters. In effect every citizen of Mexico will have access to Mexico City television (and radio).

If I were in the southwest and I had a high percentage of immigrants from Mexico living in my region, I'd be quite excited about the

possibility of offering them a **small Ku band terminal** so they could tune in (direct) the Mexico City television stations. If I lived in places such as Dallas or even Denver, where there are significant numbers of immigrants from Mexico, I'd be almost as excited. There is a Ku band market here with a special demographic profile which is about to pop open for the aggressive TVRO seller.

There is, of course, plenty of **C band** Spanish language programming. Some of that, such as the four transponders over on Intelsat at 50 west, is scheduled to shut down when the Mexican domestic bird is operational. Even those feeds that show up on Westar birds from time to time, aimed at getting programming into or out of or within Mexico will diminish.

There has been some confusion as to why Mexican planners, after several years of extensive and expensive planning around using C band for video and Ku for data and telephone would do a 'switch' virtually at the last minute. With more than 7,500 terminals planned for ground use, that kind of last minute switch had to cause some major upheavals with those planners. There has been no 'formal' statement explaining the switch but I have a pet theory of my own.

Canada is our example.

Canada started off at C band and so did the USA. When the Canadian planners tried to create a far-north TV service using ANIK (at C), they found a considerable reluctance on the part of the northern Canadians to watch and use **Canadian programming** from Anik. When these far northern terminals discovered that just a 'nudge away' from Anik they could watch HBO or WTCG/TBS, most of them started nudging. The Canadian bureaucracy didn't like this and fought it for years. **In the end they lost** and then decided to try another approach with a Ku band cable/satellite service.

I suspect that Mexican authorities drew some lessons from the 'Canadian problem' and became fearful that after they stuck 7,500 TVROs out there all over Mexico, at C band, they would find themselves trying to police that those 7,500 terminals stayed locked up on home grown television.

With all of the arguments in favor of smaller dish Ku systems in mind, and possibly even considering that a Ku service might be saleable within the U.S.A. to former residents of Mexico, I think that Ku was made 'the video band' largely as a **defensive move;** to prevent 'mis-use' of the terminals by Mexican nationals.

Whatever the reason, Mexico is about to become a hotbed of Ku band terminal activity and some of that interest and enthusiasm will spill over the border to the north. Mexico claims they have employed every known 'trick' to **restrict** their Ku band footprints to **just Mexico** with very rapid falloff outside of the country. That won't particularly affect reception in Texas, New Mexico and Arizona but further north it may be quite a challenge to bring in the Mexican Ku band signals. If you like to play with satellite systems, Ku is looking more and more like an 'experimenter's playground' in 1985 and beyond!

BUILT-In Hostility

When the State of Indiana began to crack down on TVRO installers last fall, the SPACE Dealer Board went into action. With two Indiana TVRO retailers on the Dealer Board, and one of those sitting as Vice Chairman of the Board, they had plenty of first hand experience with the problem. Basically, **here is 'the problem.'**

Indiana forces anyone performing electronic installations or doing electronic service work to be 'certified.' This means that the State wants proof that the person doing such work knows what he is doing and they conduct exams where through testing the competents are weeded out. The non-competents fail the test, don't get issued a 'certificate,' and by law may not practice in that field. The model for all of this would be the 'law bar' or the state medical examination process.

Indiana decided that installing a TVRO antenna required special skills and said that because of a 1969 law anyone who was installing TVROs without proof of those skills was agin the law. That immediately made everyone installing TVRO systems illegal. There are fines and penalties for engaging in work without a license in Indiana.

SPACE went to work to protect its members, including the two on the Dealer Board. They ran into a stone wall because the State people looked upon the 'out of state' attorneys brought to Indiana basically as carpetbaggers who were messing around with a state problem. At a series of meetings held between the state regulators and the 'maverick' TVRO installers, things got pretty heated; even abusive. SPACE

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took the same general stance it takes with people like HBO which is to say the State 'was told' what they could and could not do. Rumblings of lawsuits, taking the State to court, and other nastiness followed. When the attorneys left Indiana to head back to the sanctity of their distant offices, the Indiana TVRO dealers were left to pick up the pieces. And they, afterall, had to live there and work there.

Into this fiery situation came a group known as the Electronic Technicians Association (International), and, the Indiana Electronic Service Association. Both groups have learned to live with the state certification process and both groups have created Indiana run and operated certification courses. Since 1969, master antenna installers, antenna installers and radio/television service technicians have been going through the certification and licensing process in Indiana and after 16 years, they pretty well have it sorted out. The groups sponsored a TVRO certification course March 29/30 in Greencastle (Indiana) and 154 people showed up. At the end of the course 74 of these people then sat for the state's examination (no word on how many passed the exam). The facilities of Depauw University were used for the course.

SPACE has taken the position that the SPACE created, designed and run Dealer Certification program must be accepted by Indiana as a suitable substitute or replacement for the examinations run by the State of Indiana. As you might suspect, the State of Indiana is not anxious to allow someone else to grade Indiana people as 'competent' in the complex TVRO install world. So SPACE has the State of Indiana, it's licensing board, the Electronic Technicians Association (International) and the Indiana Electronic Service Association madder than hell. **Dick Glass,** President of the Electronic Technicians Association notes **"Indiana's license law has taken too much verbal abuse from the TVRO supplier organization, SPACE, and some TVRO dealers who don't care for regulations of any type. In an industry gaining a bad reputation as having too many fly-by-nighters and unqualified technical people attempting to perform work, the electronic associations are attempting to do something positive with good schools and technical Certification, as well as supporting good state legislation such as the Indiana law."**

The key word is all of that is **'supplier.'** Glass, respected and knowledgeable, is telling Indiana authorities that **he views** SPACE as a **'supplier organization'** and behind that adjective goes all of the usual conversation that accuses SPACE of being primarily concerned about keeping its 'supplier member factories working at full tilt,' shoving out equipment at 100 percent of capacity regardless of whom it might 'hurt' in the process.

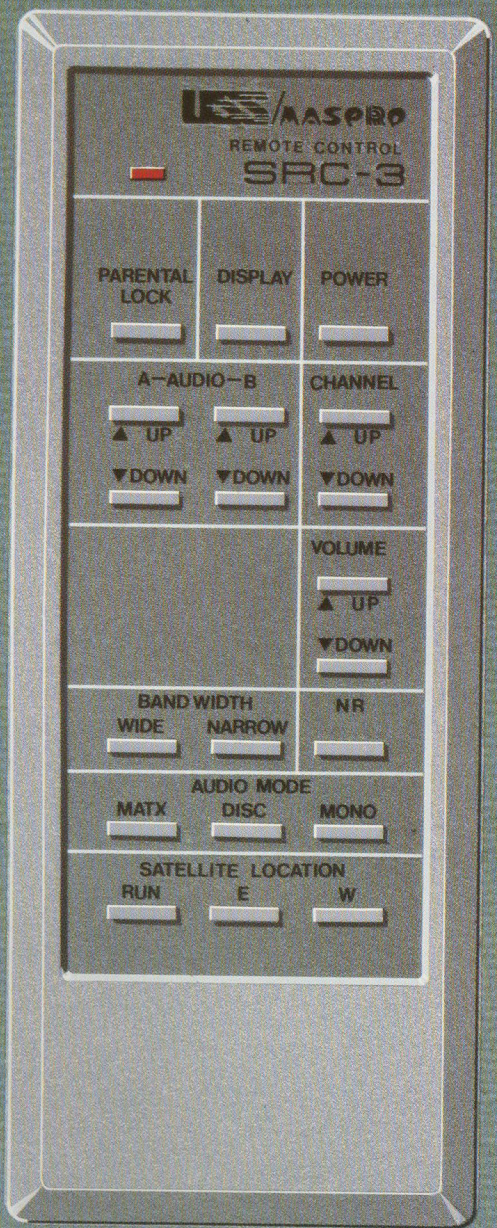
Indiana has a legal right to require licensing of people who sell services. Indiana citizens created that right through their legislative process by sending to the legislature people who voted for such a certification process. Indiana also has the right to create and administer exams, their own exams, and Indiana groups such as ETA and IESA have the right to create training courses to prepare students for those exams.

SPACE has the right to represent its member views and to work to make those views prevail.

Indiana TVRO dealers have the right to conduct their businesses, in Indiana, following whatever laws as may apply within that state. If Indiana dealers are uncomfortable with an existing law, they have the right to petition their government for change.

Glass is not far off the mark when he labels the TVRO industry as being 'unqualified' and 'fly-by-night' at the retail level. Certainly those fulltime TVRO retailers who are experiencing on-going problems 'competing' with garage or part-time installers who often leave behind improperly installed antenna systems and mal-functioning equipment would have to agree that some sort of 'cleansing process' would be useful in the TVRO retailing field.

But the state of hostility that has been created in Indiana, pitting SPACE against the state, does not resolve the real problems here. SPACE's own certification program, on the fast track (see **CSD/2** for **June 15th**), is still filled with many 'holes' and in our view SPACE is in no position of strength 'demanding' that Indiana accept a 'SPACE Certificate' **in lieu of** an Indiana exam. Let us hope that cooler, more rationale heads prevail before this problem spreads to other states where similar laws apply.



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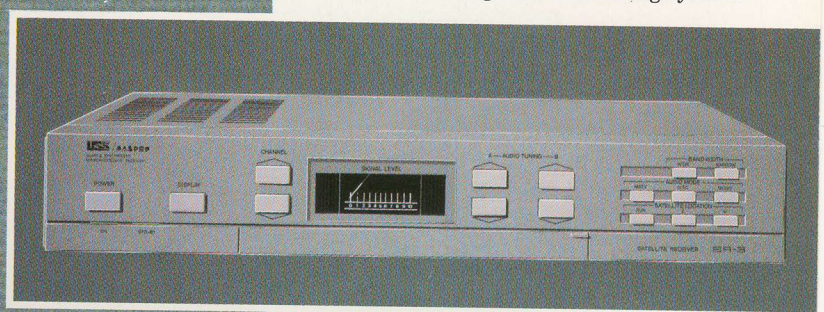

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